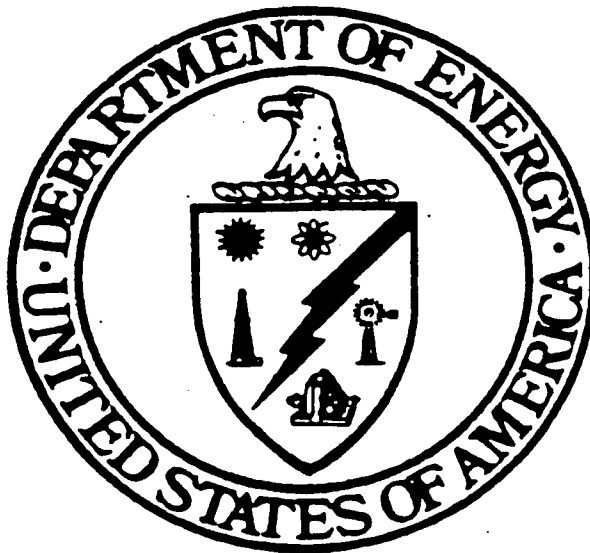


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U.S. DEPARTMENT OF ENERGY OAK RIDGE OPERATIONS

Y-12 SITE OFFICE ASSESSMENT OF ENRICHED URANIUM OPERATIONS PHASE A1 ACTIVITIES AT THE Y-12 PLANT

April 30, 1998



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Mark A. Sun
MARK A. SUN
(Name and Title)
OPERATIONS, /

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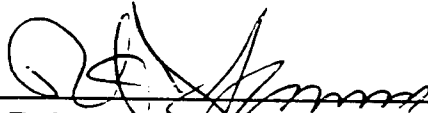
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**U. S. DEPARTMENT OF ENERGY
OAK RIDGE OPERATIONS**

**Y-12 SITE OFFICE ASSESSMENT
OF ENRICHED URANIUM OPERATIONS
PHASE A1 ACTIVITIES AT THE Y-12 PLANT**

April 30, 1998

Approved By: _____

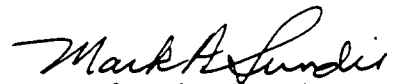


Robert J. Spence, Y-12 Site Manager

Date: _____

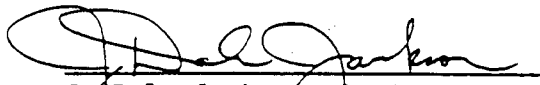
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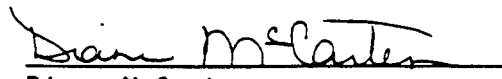

MARK A. SUNDIE
OPERATIONS, DOE-Y
(Name and Title)


UNCLASSIFIED

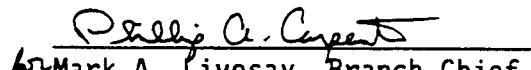
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Y-12 SITE OFFICE MANAGEMENT AND SUBJECT MATTER EXPERTS

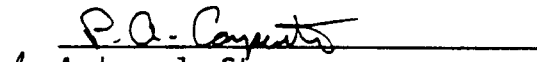

J. Dale Jackson, Acting
Y-12 Site Office Manager


Dale E. Christenson, Operations
Team, Conduct of Operations,
Configuration Management,
Engineering

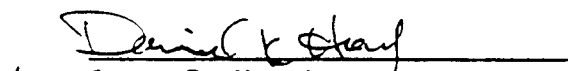

Diane McCarten
Compliance Manager

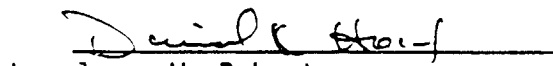

Brenda L. Hawks
Facility Representative, 9212

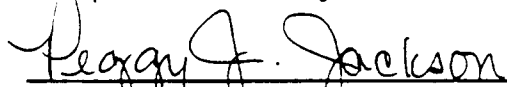

for Mark A. Livesay, Branch Chief
Program Management

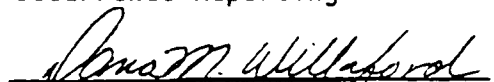

for Andrew J. Stevens
Maintenance



Sarah E. Hartson
Nuclear Facility Safety

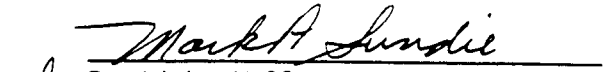

6- Susan D. Morris
Environmental Protection

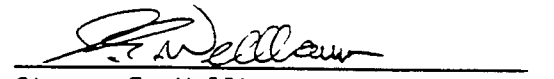

6- Jerry W. Robertson
Occupational Safety



Peggy J. Jackson
Occurrence Reporting

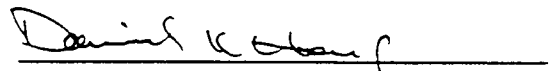

Dana Willaford
Packaging and Transportation

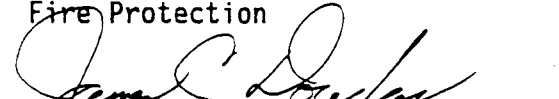

Mark A. Sundie, Operations Team
Training & Qualification
Management Systems



for David L. Wall
Senior Nuclear Engineer

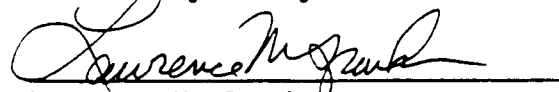

Steven E. Wellbaum
Lead Facility Representative, EUO



Stanley A. Watkins
Facility Representative, 9215

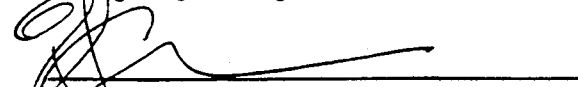

Daniel K. Hoag, ES&H Branch Chief
Fire Protection



James C. Douglas
Radiological Protection


F. Edward Kendall
Criticality Safety

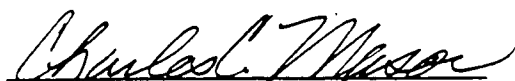

Lawrence M. Sparks
Waste Management


John D. Pearson
Emergency Management

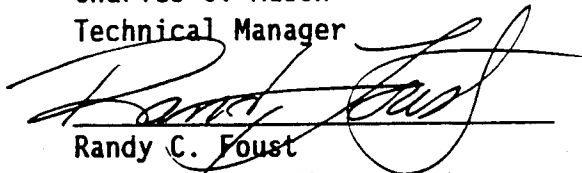

Jeffrey K. Cravens
Facility Representative, PSS


for Thomas A. Larkin
Quality Assurance

ENRICHED URANIUM OPERATIONS RESTART - PHASE A-1
Y-12 SITE OFFICE SUPPORT



Charles C. Mason
Technical Manager



Randy C. Foust
Configuration Management,
Engineering



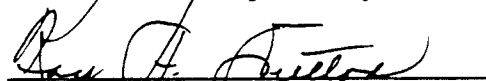
Frank S. Poppell
Conduct of Operations



John F. Conlon
Management Systems
Nuclear Facility Safety



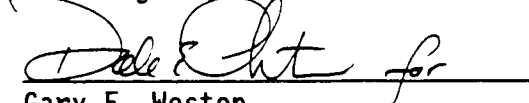
Thomas Tracy
Nuclear Facility Safety



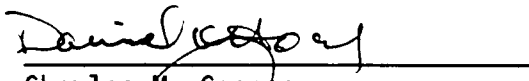
Kay F. Dutton
Lead Administrative Support



Thomas Rogers
Training & Qualification



Gary F. Weston
Conduct of Operations
Procedures



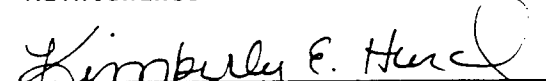
Charles M. Coones
Fire Protection



M. Bradford Graves
Radiological Protection



Ronald J. Cook
Maintenance



Kimberly E. Hurd
Administrative Support
Database Management

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EXECUTIVE SUMMARY

The Department of Energy (DOE) Y-12 Site Office (YSO) organized and tasked a 20-member team of subject matter experts (SME), with diverse nuclear backgrounds, to conduct an assessment to verify the state of readiness of Lockheed Martin Energy Systems, Inc., (LMES) to resume safe operations of the Enriched Uranium Operations (EUO) in accordance with the requirements of DOE Order 425.1, *Startup and Restart of Nuclear Facilities*, following the stand-down of the Y-12 Plant facilities on September 22, 1994. These YSO review activities were full-time, dedicated efforts in planning and executing the YSO oversight of resumption activities at the Y-12 Plant.

This assessment confirmed the responsibility of DOE line management for verifying and recommending the contractor's readiness to resume operations to the approval authority and was conducted in the Enriched Uranium Operations (EUO) mission area during the last half of calendar year 1997 and in early calendar year 1998.

The YSO team performed the assessment in accordance with *Y-12 Site Office Assessment and Oversight Plan for Enriched Uranium Operations, Phases A1 and A2*, dated March 11, 1998, that was scoped to be consistent with the *Lockheed Martin Energy Systems, Inc., Readiness Assessment Plan of Action (POA) for the Enriched Uranium Operations Activities at the Oak Ridge Y-12 Plant*, with the DOE Order 425.1, and with the items required for resumption as identified by LMES. The YSO Core Objectives (CO), which are described by the DOE Order 425.1 and scoped in the LMES POA, were used and organized into 16 functional areas as follows:

- Conduct of Operations
- Configuration Management
- Emergency Management
- Engineering
- Environmental Protection
- Fire Protection
- Maintenance
- Management Systems
- Nuclear Criticality Safety
- Nuclear Facility Safety
- Occupational Safety and Health Administration (OSHA)
- Packaging and Transportation
- Quality Assurance
- Radiological Protection
- Training and Qualification

- Waste Management

A portion of the YSO review included assessments of LMES' implementation of DOE Order 425.1 requirements in the performance both of their Management Self-Assessment (MSA) and of the LMES Operational Readiness Review (ORR).

During the review, the YSO generated 106 deficiencies. Seventy-six of these deficiencies were categorized as prerestart, and 30 of the 106 deficiencies were categorized as postrestart. In addition, the YSO reviewed existing open deficiencies to determine their applicability to EUO restart. As a result of this review, an additional 55 prerestart and 36 postrestart deficiencies were identified. LMES had closed all prerestart deficiencies, with the exception of 34 deficiencies at the time of this report. The remaining prerestart deficiencies have corrective action plans with closures scheduled to be completed within 15 days of this report. The LMES MSA and ORR for Phase A1 were completed and satisfactorily met the requirements of DOE Order 425.1 and verified the readiness of EUO to resume operations. On April 28, 1998, LMES submitted a letter to DOE management, certifying their readiness to resume activities in the EUO and documenting an acceptable status for all open items.

**U.S. Department of Energy
Oak Ridge Operations
Y-12 Site Office Restart Team
Assessment of the Enriched Uranium Operations
Activities at the Y-12 Plant**

1.0 INTRODUCTION

The DOE formalized a system to standardize and control the process of facility start-ups as outlined and administered by DOE Order 425.1. As part of this process, the DOE line management must validate the contractor's state of readiness and then must provide a recommendation to proceed with the DOE Independent Operational Readiness Review (ORR). The overall framework to restart facilities at the Y-12 Plant is included in Y/AD-623, *Plan for Continuing and Resuming Operations, Oak Ridge Y-12 Plant*, that was concurred by the Assistant Secretary for Defense Programs. To meet the intent of the DOE Order 425.1 requirements, the DOE YSO organized and tasked a team of SMEs to evaluate LMES readiness to resume EUO activities. YSO biographical information is provided in Appendix 6.4.

The results of the YSO assessment of the EUO and the recommendations to the Y-12 Site Manager are documented in this report.

1.1 Background

The YSO was tasked to monitor the management and performance of the EUO Program of LMES in order to evaluate the restart progress, the adequacy of LMES Functional Area upgrades for restart, and the overall EUO readiness in accordance with the DOE Order 425.1. These criteria are chosen to provide the Y-12 Site Manager with the bases for the recommendation to proceed with the independent DOE ORR.

The contractor was required to complete all the EUO activities to support national defense priorities by determining the plant systems and processes needed to support mission activities; by upgrading the facilities, engineering information, programs, and procedures; and by ensuring personnel training, qualification, and performance of those processes to ensure safe operation. The EUO Process-Based Restart (PBR) was managed by the contractor in accordance with the DOE-approved contractor EUO Restart Plan, schedule, and budget that defines the estimated scope, duration, resource, costs, and the POA that defines the scope and duration of the ORR processes.

The PBR process was divided into three phases that represent the major plant processes and programs that must be ready for restart of EUO to support manufacturing and production. This report applies to the first of the restart phases, Phase A1. Phase A1 covers the metal-working (casting, machining, rolling, and forming) processes, including some supporting accountability processes. All of these operations are located in Buildings 9212 and 9215 and in several smaller support buildings. Within the scope of this Plan, the YSO incorporated oversight activities from the following four general areas:

- Facility Representative Oversight Activities
- Functional Area Assessment Activities
- Program Management and Environmental Safety and Health Branch Activities
- Schedule Monitoring and Oversight

This report describes the combined results of the YSO assessments and provides the recommendation to the YSO Site Manager to commence the independent DOE ORR.

1.2 Scope

Management of both the DOE and LMES made the decision to restructure the Phase A restart of EUO into two ORRs--Phase A1 (casting, machining, rolling, and forming) and Phase A2 (accountability processes). The restructuring was necessary to support DOE's national priority program. This restructuring does not change the total scope of Phase A; therefore, these changes neither will compromise safety nor will have any impact on the mission schedule. The DOE POA and LMES POA were revised to reflect this restructure.

The YSO assessment, which was conducted in accordance with *Y-12 Site Office Assessment and Oversight Plan for Enriched Uranium Operations Phase A*, evaluated the adequacy of the actions taken by LMES to prepare EUO for restart in 16 functional areas. These functional areas were assessed, and the results were documented in accordance with YSO Operating Procedure YSO-5.4.1, *Restart Team Assessments*, dated April 15, 1995.

2.0 OVERALL ASSESSMENT PROCESS

2.1 Conduct of the Assessment

This assessment was based upon a set of criteria and review-approach documents (CRADs) that have been generally used and accepted in ORR in Defense Program (DP) facilities throughout the DOE Complex. In addition to the readiness of the people, documentation, and equipment, Phase A1 contains a validation of the programmatic elements of each functional area. This validation of the administrative and safety management programs is applicable to the entire EUO facility complex. The CRADs used in this assessment were designed to ensure that the facility is compliant with the minimum core requirements, as outlined in Doe Order 425.1, and is ready for restart. Each SME had CRADs assigned to their respective functional area that required documentation of their individual reviews. In general, the assessment approach included a review of each functional area to ensure the contractor has established an adequate program for a safe restart. This determination was based upon a graded approach; some program items were deemed as postrestart. Each SME validated the implementation of those portions of the program through direct observation in the field.

The assessments were performance-based with satisfactorily validated requirements identified for restart in the POA. The CRADs define both the criteria by which these requirements are satisfied and the review approach by which each criteria are assessed. The review generally involved observations, document reviews, and interviews. Details of the reviews and deficiencies are maintained in the YSO evidence files.

The YSO Facility Representatives were also a component of the YSO contractor oversight program with the responsibilities for routine assessments of operational performance, quality assurance, management control, and assurance of worker safety and health.

The Facility Representatives served as a primary safety component of the YSO contractor oversight program with the responsibilities for routine assessments of operational performance, quality assurance, management control, and the assurance of worker safety and health. Their objectives included planned assessments to achieve a general evaluation of activities germane to EUO restart and monitoring of EUO-continuing operations to ensure that these activities are consistent with the DOE approvals for those activities.

2.2 Assessment Documentation Process

SMEs documented their assessment activities immediately upon completion of their reviews. Assessment activities, which have documented weaknesses and deficiencies, were made available to the EUO Facility Representatives, SMEs, and the Operations Support Team.

Prior to providing any deficiencies to the contractor, the deficiencies were provided to the Deficiency Review Board (DRB) for screening and evaluation. The SME submitted the deficiency to the DRB by completing a Form 2 (EUO Deficiency Form). The DRB evaluated each deficiency identified for applicability to the scope of restart and categorized the deficiency as prerestart or postrestart. The DRB also ensured that all deficiencies are included in the YSO Monthly Assessment Report (MAR).

The formal restart documentation of each functional area was accomplished by completing the Form 1 (EUO Appraisal Form). A Form 1 was completed for each objective listed in the Functional Area CRADs. The information contained on the Form 1 was drawn from the assessment documentation. Each Form 1 was sufficiently detailed to indicate how each of the review approach was accomplished, and any deficiencies identified should be highlighted.

3.0 SUMMARY OF RESULTS

3.1 Functional Area Summaries

3.1.1 Conduct of Operations (OP)

The objective of this functional area review was to verify that the contractor had established and effectively implemented an adequate Conduct of Operations Program. The specific objectives were to ensure (1) Operations personnel have an adequate level of knowledge of the system and facility hazards and an awareness of safety, health, and environmental requirements; (2) Conduct of Operations requirements, as stated in DOE Order 5480.19, *Conduct of Operations Requirements for DOE Facilities*, are adequately implemented to resume operations; (3) adequate, technically correct procedures that are consistent with the facility safety basis have been developed and implemented; and (4) an effective routine operations drill program has been established and implemented.

The review determined that the operations programs are generally acceptable and adequately implemented. The DOE Team reviewed and witnessed the performance of field operations, training, and operational drills in order to evaluate the effectiveness of the conduct of operations implementation. The implementation of conduct of operations was observed throughout the pre-MSA, MSA and LMES ORR periods. Operations personnel demonstrated an improvement in formality and control of operational activities throughout this period of observation, although the need for mentors as a compensatory measure was observed. The Conduct of Operations Program guidance was also found to be acceptable, and contained the necessary guidance to implement DOE Order 5480.19 requirements. Operations procedures have been upgraded in technical adequacy throughout the cold start process, although extensive procedure modifications were required to achieve the desired level of adequacy. The operation drill program, although lacking maturity, was determined to be adequate in both program control and drill performance.

OP-1: Level of knowledge of Operations and Plant Shift Superintendent (PSS) personnel is adequate, based on reviews of examinations and examination results and selected interviews of Operations and PSS personnel.

The level of knowledge of operations personnel was demonstrated as adequate in EUO when the operators had been involved in the performance of cold-start activities that included dry runs and operations with surrogate material. The level of knowledge of EUO and support organization personnel was evaluated as part of the Training and Qualification functional area. Operations and PSS personnel have demonstrated an adequate level of knowledge of the safety envelope and facility systems during the performance of activities. Operations personnel have also demonstrated an understanding of health and safety concerns in the areas of radiological control, fire protection, industrial safety and waste management.

OP-2: Operations personnel exhibit an awareness of public and worker safety and health and environmental protection requirements, and through their actions, demonstrate a high-priority commitment to comply with these requirements.

Operations personnel have been trained and have been observed to demonstrate an adequate awareness of worker safety, health and environmental awareness, and a commitment to comply with these requirements. The Operations Training Program requires both oral and written examination of the operators understanding of these

requirements. Observation of EUO activities has demonstrated this operational awareness.

OP-3: The implementation status of DOE Order 5480.19 and appropriate Standard/Requirement Identification Document (S/RID) is adequate for operations. Noncompliance issues are addressed.

The implementation status of conduct of operations in select areas have not achieved the necessary maturity to ensure the required rigor and formality of operations. Mentors have been assigned as compensatory measures for some conduct of operations inadequacies to ensure the safe operation of the facility. These noncompliance areas and compensatory measures are addressed in the EUO Conduct of Operations Request for Approval, LMES/Y-12-DOE-5480.19-CSA-162. The *Enriched Uranium Operations Mentor Program*, Y/MA-7309, defines the role of the mentors and the necessary actions for the removal of mentors. The mentors have been assigned in safety oversight roles for selected fissile material activities and will also provide operations program assessments to ensure continued improvements are made in the conduct of operations program implementation. The EUO Conduct of Operations Program is adequately defined in the *Nuclear Operations Conduct of Operations Manual* (NOCOOM).

OP-4: Adequate, correct procedures are available for operating and maintaining the process systems and designated utility systems. Procedures have been revised to reflect modifications to the facility. Procedures, as affected by facility modifications, are consistent with the description of the facility, procedures, and accident analysis included in the safety basis.

Significant deficiencies in the technical content of procedures have indicated that there are problems with the EUO development, verification, and validation of procedures. The cold-start process was significantly hampered by the need for many procedural modifications and required that procedures be red-lined during practice operations in order to generate technically adequate procedures. Deficiencies with operations use of procedures require that compensatory measures and additional restrictions be implemented by EUO and DOE to ensure adequacy of operations. Select restarted processes and activities will require both LMES management and mentor safety oversight as a defined EUO Mentor Program and the *Enriched Uranium Operations Start-up Plan*, Y/MA-7367. The DOE will also provide operations oversight on selected restarted activity areas.

OP-5: A routine operations drill program, including program records, has been established and implemented.

The EUO routine operational drill program has been developed and implemented to an acceptable level for EUO restart. The EUO operations drill program is immature, and continued development of operator drillmanship, drill scenarios, and formalized feedback needs to occur. The EUO operations drill program continues to improve and is adequate for safe operations.

In summary, EUO operator knowledge, conduct of operations implementation, operating procedures, and operations drill programs are adequate, pending acceptable resolution both to the DOE assessment prerestart deficiencies as well as to the internal LMES MSA and ORR prerestart deficiencies. The resumption of Phase A1 activities will require additional compensatory measures for operations and procedure deficiencies to be developed and implemented prior to DOE authorization to restart. Deficiencies and weaknesses identified during this functional area review are listed below.

DEFICIENCIES:

Prerestart

OP-3: Chapter 1, "Organization"

DI-EUO-98-04-06 Programmatic elements of the NOCOOM are not in place in EUO.

OP-3: Chapter 2, "Operator Rounds and Shift Operating Practices"

DI-EUO-98-02-03 Performance of operator rounds in Buildings 9212 and 9215 needs improvement in implementation.

DI-EUO-98-04-08 No qualified shift manager assumed command function.

OP-3: Chapter 4, "Communications"

DI-EUO-98-03-03 The PA system is inappropriately utilized for routine paging of personnel within Area 5.

OP-3: Chapter 6, "Investigation of Abnormal Events"

- DI-EUO-98-03-12 Corrective actions from management reviews are not captured, tracked, or reported.
- DI-EUO-98-03-13 Lessons learned are not disseminated and appropriately incorporated.

OP-3: Chapter 8, "Control of Equipment and System Status"

- DI-EUO-98-02-04 EUO shift operations management is not controlling on-going maintenance.
- DI-EUO-98-02-08 Control of equipment and system status in Buildings 9212 and 9215 is inadequate.
- DI-EUO-98-04-05 A complete system alignment check of Buildings 9212 and 9215 Fire Protection System has not been performed.
- DI-EUO-98-03-01 Piping that could bypass the safety system interlocks of the E-Wing Dry Vacuum System is inadequately controlled.

OP-3: Chapter 9, "Lockout/Tagout"

- DI-EUO-97-12-06 Operations personnel do not utilize available controlled drawings.
- DI-EUO-97-12-07 MK-Ferguson employees have not had training to safely perform isolations.
- DI-EUO-97-12-08 The steam system configuration is not consistent with current drawing.

OP-3: Chapter 10, "Independent Verification"

- DI-EUO-97-12-03 EUO Standing Orders do not adequately identify all components/systems requiring independent verification.
- DI-EUO-97-12-04 Independent verification on EUO system alignment checklists has been incorrectly eliminated.

OP-3: Chapter 11, "Logkeeping"

DI-EUO-98-01-14 Noncompliance with DOE Order 5480.19 and NOCROOM, Chapter XI.

DI-EUO-98-01-16 Failure to record significant events in Building 9212 E-Wing.

OP-3: Chapter 12, "Turnover"

DI-EUO-98-02-16 Turnover Checklists do not include all applicable sections as required by Chapter 12.1 of the NOCROOM.

DI-EUO-98-01-01 Shift manager is relieved by the supervisor during the night shift.

DI-EUO-98-02-17 The oncoming building shift manager in the morning does not receive a formal shift turnover from the shift supervisor.

OP-3: Chapter 16, "Operating Procedures"

DI-EUO-98-02-02 An EUO checklist is incorrectly being used to operate a process system.

DI-EUO-98-03-21 Site Operations Center (SOC) has not adequately implemented Chapter 16 of DOE Order 5480.19.

DI-EUO-98-01-17 Inadequate responses to operational problems.

DI-EUO-98-02-01 Building 9212 E-Wing chemical and radiological hood surveys.

DI-EUO-98-02-08 AOPs and EOPs are not properly characterized to the accident type they are intended to minimize.

OP-3: Chapter 17, "Operator Aids"

DI-EUO-98-01-13 EUO operator aids are not in compliance with Chapter 17.

OP-5: Operations Drills

- DI-EUO-98-02-05 Operations personnel are not referring to Abnormal Operations Procedures (AOPs), Emergency Operations Procedures (EOPs), or Facility Emergency Plan (BFEP) to verify actions taken in response.
- DI-EUO-98-02-06 The 911 system encumbers emergency response communications.
- DI-EUO-98-02-07 Drill scenarios and drill objectives inadequately reference the governing documents that are being evaluated during the conduct of drill and do not contain the correct expected responses.
- DI-EUO-98-02-12 Drill was not executed in accordance with the drill scenario.

Postrestart

OP-3: Chapter 1, "Organization"

- DI-EUO-98-03-11 Nuclear Conduct of Operations Administrative Programs, Section VI, has not been implemented.

OP-3: Chapter 6, "Investigation of Abnormal Events"

- DI-EUO-98-03-14 Chapter 6 of the NOCOOM does not address event-trending and sabotage.
- DI-EUO-98-03-15 Root-cause analyses are not generally performed for management reviews.

OP-3: Chapter 8, "Control of Equipment and System Status"

- DI-EUO-98-01-15 Failure to support Radiological Roughing Filters in Building 9212 E-Wing.

OP-3: Chapter 12, "Turnover"

- DI-EUO-98-02-18 Building 9215 has no implementation document to provide the requirements for shift turnover to and from the PSS as allowed by CSA-162D.

OP-3: MOUs

DI-EUO-98-04-04 MOU-030 is inadequate in defining EUO/FDO Conduct of Operations responsibility and interface areas.

DI-EUO-98-04-11 FMO MOUs do not adequately identify the requirements of the NOCOOM.

WEAKNESSES:

- EUO Operations programs, as assessed by the DOE in Buildings 9212 and 9215, have indicated that there is very little consistency in the Operations Program guidance and the implementation between the two EUO facilities. The general concern of DOE is effective operations programs are typically standardized and consistent, which reflect common management guidance. The operations programs of Buildings 9212 and 9215 are being developed and implemented with little program commonality. Management and administration of EUO will become more difficult as each of these separate facility operations programs are further diverged and matured.
- Drill scenarios are not sufficiently developed to allow drill monitors to provide timely information to all participants to allow them to make the necessary evaluation of the upset condition and then to take the appropriate actions. The scenarios should be appropriately updated each time the drill is performed, which will allow the drill scenario and drill program to mature with time.
- For limited external drills, not all drill controllers/evaluators have completed training on the conduct of drills, which would train them on how to be effective drill controllers/evaluators. Controllers/evaluators attend a training session immediately before each limited external drill, but this training is focused upon the scenario and controls for the upcoming drill.
- Radiological response is not realistically demonstrated during limited external drills since the response equipment is prestaged in the vicinity of the drill. Additionally, radiological data are not adequately provided in all drill scenarios to allow radiological technicians to "earn" the data necessary to evaluate the level of knowledge of the participant.

- The drill participants need practice in drillmanship.
- The drill participants should respond to the cues that are provided to them during the course of a drill. If a cue is provided, respond accordingly and do not wait for the next cue to be provided. Drill participants should also verbally explain what they are doing while they are performing actions. This allows the drill evaluators to know what actions are adequately taken and to determine if the participants have an adequate level of knowledge. Drill participants need to think and act as though they are responding to the real thing.
- Facility drill coordinators (FDC) do not consistently ask the drill monitors to provide feedback on the drill scenarios or on drill controls.

The drill feedback system meets the requirements of the Conduct of Training Manual, but it is very weak in identifying specific corrective actions and ensuring that the corrective actions are completed.

Only one corrective action has been identified, and no training enhancements have been identified to date. Numerous problems that would require corrective action are informally communicated and captured by only the persons immediately involved in the drill.

- The communication of lessons learned throughout the EUO Organization for EUO operational drills is informal and inconsistent.
- The EUO drill program is developing and still maturing. Significant lessons learned are not being adequately shared between the facility drill coordinators and between the Buildings 9212 and 9215 operating organizations. Documentation stops at electronic mail that go to the Operations managers, except for the briefing sheets developed by the Building 9215 FDC. No accounting is done on who actually receives the lessons-learned briefings that are conducted in the facility.
- In some cases, the expected operator response is based upon no formal training or procedure guidance. Operators should be trained upon how to respond to all anticipated abnormal conditions.
- During the limited external drills, the responsibilities of and the

coordination between the on-scene facility personnel and the incident responders needs to be better understood by all personnel.

- Numerous problems have been observed during the conduct of the limited external (LE) drills conducted by EUO operations which indicate problems with announcements and decisions for facility evacuation, turnover of incident command function, responders showing up at the staging areas, technical support to the incident command, and understanding the reentry conditions.

3.1.2 Configuration Management (CM)

The objectives of this functional area were to verify that systems and equipment are defined consistent with their importance to safety and that a system to maintain control over the design and modification of facilities, systems, and equipment is established. The review also included evaluations to verify that facility systems are consistent with the description of the facility, procedures, and accident analysis included in the safety basis and that the implementation status for associated configuration management S/RID requirements have been addressed. In essence, the review focused on the configuration management program implemented in EUO according to the requirements for Phase A1 restart as defined by the POA. The review was divided into three major areas each with its own CRAD. Results of each review area (CRAD) are highlighted below:

The review of CRAD CM-1 evaluated whether administrative controls were in place to ensure that repairs or modifications were adequately analyzed to ensure that design changes are documented and approved prior to implementation. The review focused on recent design changes and their impacts on as-configured documentation, interviews of personnel responsible for the development and execution of the change control program, document control and records management programs, and evaluation of maintenance activities. During this activity, three deficiencies were identified in two major areas of activity.

Two deficiencies were identified in the area of document control and records management, and one deficiency was identified in the area of maintenance activities. One document control/records management (DC/RM) deficiency cited the Fire Protection Organization (FPO) for utilizing Standing Orders to define and administer the DC/RM program. This was noted as a violation of 5480.19 (DI-EUO-98-03-20). The second DC/RM deficiency cited Facilities Management Organization (FMO) for failing to implement the DC/RM requirements defined by MOU between EUO

and FMO, DOE-STD-1073-93 and DOE Order 5700.6C (DI-EUO-98-03-18). The deficiency addressing maintenance activities cites inadequate FMO procedures to properly define the use of Maintenance Job Requests (MJR) to execute modifications and thus properly integrate with the EUO process for change control (DI-EUO-98-03-19). All three of these deficiencies were classified as postrestart.

The review of CRAD CM-2 evaluated whether the configuration of facility systems are consistent with the description of the facility, procedures, and accident analysis included in the safety basis. The review focused on evaluating systems and components designated as safety class or safety significant as defined by the safety basis documentation and criticality safety requirements (CSRs), the temporary modification program, equipment tagging and labeling in EUO, and the interaction and interface between process system owners for change control. During this activity, six deficiencies were identified. All six deficiencies were identified from the review of the safety basis documentation and CSRs in comparison to the structures, systems and components (SSC) grading assigned to the equipment as reflected on the master equipment lists (MELs).

The review of CRAD CM-3 evaluated whether the implementation status for associated S/RID requirements is adequate for operations. The review included evaluating whether EUO is in compliance with the S/RID requirements for configuration management. For requirements where it is determined that EUO was not in compliance, the review included evaluating the review of compliance packages and interviews of responsible personnel on their knowledge of these noncompliances. No deficiencies or weaknesses were identified during this evaluation.

In summary, it has been determined that EUO has developed and implemented their commitments for Phase A1 restart. The CM activities and initiatives that will not be implemented before restart are known to those individuals within EUO who are responsible for the development and implementation of CM. The EUO Configuration Management Program, as defined and implemented for Phase A1, was determined to be sufficient to ensure that adequate controls are in place to maintain the configuration status of EUO and, specifically, those systems and equipment designated as safety class, safety significant, or important to safety upon correction of the prerestart deficiencies identified below:

DEFICIENCIES:

Prerestart

- DI-EUO-98-01-03 Equipment and components important to criticality safety are not assigned an SSC designation consistent with the requirements from the BIO and CSR's as defined by CM-43, Rev. 1, *Y-12 Guidance for Grading Structures, Systems, and Components*.
- DI-EUO-98-01-04 Equipment which performs a function for abnormal response or upset conditions are assigned an SSC grade not reflective of their importance to the operations of the system.
- DI-EUO-98-01-05 SSC-grading criteria is not consistently applied to equipment which performs similar functions.
- DI-EUO-98-01-06 Radiation-monitoring equipment and alarms associated with Stacks 38 and 48 are not identified on the MEL and do not have a safety grade assigned.
- DI-EUO-98-01-07 All components contained within a control circuit are not assigned an SSC designation consistent with their importance to safety.
- DI-EUO-98-01-08 Safety grades for piping, interconnecting wiring, ducting, and instrument lines are not defined for all process systems.

Postrestart

- DI-EUO-98-03-18 The document control and records management practices employed by FMO are not in compliance with the requirements of DOE Order 5700.6C Criterion 4 as defined by LMES Procedures IO-101 and IO-201, Y-12 Procedure Y10-189, and MOU-43.
- DI-EUO-98-03-19 The FMO procedures used to development of MJRs which are written to execute modifications do not contain sufficient detail or guidance to ensure critical elements of the work activity are defined, performed and verified.

DI-EUO-98-03-20 The FPO's use of Standing Orders to define and control their document control and records management program is not in compliance with the requirements of DOE Order 5480.19, Chapter XV.

WEAKNESSES:

No weaknesses were identified.

3.1.3 Emergency Management (EM)

The objectives of this functional area review were to determine whether an Emergency Preparedness Program is adequate for safe operations and is established with sufficient qualified personnel, facilities, and equipment (EM-1); whether the level of knowledge of operations-support personnel is adequate (EM-2); whether an emergency drill program has been implemented (EM-3); and whether the implementation status for DOE Order 151.1 and associated S/RIDs is adequate for operations (EM-4). Specifically, the review verified that objectives EM-1, EM-2, and EM-3 have not been fully implemented. Objective EM-4 has been implemented and will support safe operations in EUO.

In summary, additional attention is needed to improve:

- emergency management program implementation including procedures;
- operations support personnel knowledge of the emergency requirements; and
- planning, execution, quality, and realism of emergency management drills.

DEFICIENCIES:

Prerestart

DI-EUO-98-03-02 Piping that could bypass E-wing Dry Vacuum System (DVS) safety system interlocks is inadequately controlled.

DI-EUO-98-03-27 The level of knowledge of operations support personnel is inadequate. The BFEPs were completed and approved, but are lacking in specific hazard detail, or in reference to specific emergency and abnormal operating

procedures. Therefore, the operations-support personnel have not received the necessary information or training for critical operations and shutdown procedures. There is a lack of procedures, position descriptions, written responsibilities, etc., for the operations-support personnel.

- DI-EUO-98-03-28 While an active Emergency Drill Program exists, deficiencies in planning, execution, quality, and realism have occurred in numerous instances in recent months. While some improvements have been noted, sustained demonstrated improvements are needed to provide assurance that an effective drill program is in place.
- DI-EUO-98-03-29 The Emergency Preparedness Program for the EUO facilities has not been established sufficiently to ensure emergency preparedness is adequate for safe operations.

3.1.4 Engineering (EN)

The objectives of this functional area were to verify that an Engineering-Support Program is established and defined with sufficient numbers of qualified personnel who are knowledgeable of the programs for engineering support, including change control and design control. The verification also included an evaluation on the implementation status for associated engineering S/RID requirements. The review was divided into three major areas each with its own CRAD. The results of each CRAD review are highlighted below.

The review of CRAD EN-1 evaluated whether the engineering-support organization was established and functioning to support operations. The review included evaluation of functions, assignments, responsibilities, and reporting relationships to ensure they are clearly defined, understood and effectively implemented. The performance of this evaluation included a review of procedures, organizational charts, position descriptions; interviews of engineering support personnel; and observations of work activities.

During this evaluation, one deficiency was identified for failure of EUO engineering and Central Engineering Services (CES) to provide Facilities Management Organization (FMO) adequate interface and information to ensure compliance with technical specification and the design basis on minor modifications (DI-EUO-98-04-09).

The review of CRAD EN-2 evaluated whether the engineering-support personnel demonstrate an adequate level of knowledge through interviews, observations of work activities, and review of training records. In general, training requirements for engineering-support personnel required for Phase A1 were satisfied and documented. Interviews of personnel noted an acceptable level of knowledge and understanding of their roles, responsibilities, interfaces with operations, and reporting relationships.

The review of CRAD EN-3 evaluated whether the implementation status for associated S/RID requirements is adequate for operations. The review included evaluating whether EUO is in compliance with the S/RID requirements defined for the Engineering functional area. The evaluation concluded that the implementation status is adequate for operations noting that the engineering functional area no longer has a defined set of S/RID requirements but instead utilizes a defined set of work smart standards as approved by DOE.

In summary, the engineering support is established, defined, and implemented adequately to support operations for Phase A1 restart. The level of knowledge and understanding of EUO technical support personnel, as required for restart, was determine to be adequate. No concerns, deficiencies, or weaknesses were noted in engineering technical support that could jeopardize the safe restart and operation of the Phase A1 process systems, and as such no prerestart deficiencies were identified. The postrestart deficiency identified during this functional area review is listed below.

DEFICIENCY:

Postrestart

DI-EUO-98-04-09	EUO Engineering and CES (through their interfacing responsibility with EUO) failed to provide Facilities Management Organization (FMO) adequate interface and information to ensure compliance with technical specifications and the design basis on minor modifications executed according to MJRs.
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WEAKNESSES:

None

3.1.5 Fire Protection (FP)

The review of the LMES Fire Protection Program for restart of EUO consisted of three CRADS, one each on the material condition of the facility, the ability of support personnel to respond to normal and abnormal conditions in the facility and the level of order compliance in the facility. Facility inspections were performed, along with interviews of selected personnel from Fire Department Operations and review of records. Record review included training records and test, maintenance and inspection (TMI) records, building inspection results, drill critiques and order compliance packages (RFAs/CSAs). The fire hazards analyses for the EUO facilities were reviewed and compared to field conditions. Compensatory actions in place in the facility were also reviewed; these actions had been implemented by LMES due to deficiencies identified by DOE-YSO and LMES in various portions of the fire protection program.

There are some important areas that are not contained in typical CRADS that are subject to the typical YSO appraisal schedule, such as emergency lighting and life safety. Review of these areas indicate numerous deficiencies with fire doors, fire barriers, and emergency lighting. Compensatory measures are currently in place to require flashlights to be carried in certain areas of EUO to mitigate a lack of adequate emergency lighting. Likewise, fire doors have been closed to compensate for inoperable automatic door closers, missing latches, or failure to operate. Compensatory measures, such fire patrols, remain in place in B-1 Wing and on the brine system.

The sprinkler systems in EUO are maintained in adequate condition. Detection systems have been tested and are generally operable. Testing of fire system interlocks indicates a high rate of failure of these devices. There are also a number of recommendations in the EUO Fire Hazards Analyses that will require contractor disposition prior to restart.

In conclusion, the processes in the EUO facilities appear to be properly protected, with the exception of B-1 Wing. This area remains under compensatory actions and will be acceptable to restart with the additional precautions taken by the Fire Department and EUO. The high availability of the fire sprinkler systems compensate for the fire

barrier deficiencies, allowing these issues to be resolved after restart. Training of the Fire Department appears adequate for restart; however, the mutual aid provisions should be exercised. Additional work in the life safety area, as outlined in the FHA recommendations, should be accomplished prior to restart to ensure that egress routes are protected by operable doors and that the egress routes are adequately lit under all conditions. Deficiencies and weaknesses identified during this functional area review are listed below.

DEFICIENCIES:

Prerestart

- DI-EUO-98-02-13 Fire Department Required Reading for EUO BIOs and OSRs contains the incorrect Building 9215 OSR; also does not include the Building 9215 BIO nor the Building 9212 BIO.
- DI-EUO-98-02-19 On January 29, 1998, the Y-12 Fire Department performed training for procedure Y52-51-FDO-005, Monthly and Annual Fire Protection Surveillances - Firecycle Sprinkler System 6 in Building 9204-2. As of January 30, 1998, this procedures was still unissued and in the comment resolution cycle.
- DI-EUO-98-02-20 Training requirements for Fire Protection engineers do not meet DOE Order 5480.7A for designation as a qualified Fire Protection Engineer.
- DI-EUO-98-02-21 Qualification requirements for fire office in the Fire Department program do not require training in incident command. This is a vital are for all emergency response to EUO.
- DI-EUO-98-02-22 Subcontractor fire protection engineers working for Fire Department Operations (FDO) have not been qualified for their positions as required.
- DI-EUO-98-02-23 The qualification requirements contained in the *Quality Assurance Plan for Y-12 Fixed Fire Protection Systems*, dated December 15, 1995, is not reflected in the DOE Order 5480.20A training program in the Fire Department.

- DI-EUO-98-02-24 Qualification requirements for fire inspectors include only wet pipe sprinkler systems, firecycle sprinkler systems and Gamewell alarm systems. Building 9212 contains one dry pipe and one deluge system. Building 9215 has two non-OSR dry pipe systems. Both buildings contain heat and smoke detectors.
- DI-EUO-98-02-27 Inspection of Building 9980 showed that new construction had installed an exit sign to the roll-up door to the east, opposite door No. 105. This roll-up door was locked with a padlock.
- DI-EUO-98-03-24 DOE Order 5480.7A requires an annual appraisal of facilities valued in excess of \$50 million, or for those hazard Category 1 or 2 facilities. No fire protection assessment has been done in 1997 for Buildings 9215 or 9998.
- DI-EUO-98-03-30 Life safety doors in Building 9212 were found to be blocked open. The EUO Fire Safety Procedure implementation is not correcting storage issued in E-Wing Basement.
- DI-EUO-98-03-31 Specific BIO commitments in fire protection do not exist in the LMES program.

Postrestart

- DI-EUO-98-02-25 The sprinkler system in Building 9215, H2 Inspection, is deficient. Several of the ceiling tiles are missing and one sprinkler head is recessed above the suspended ceiling.
- DI-EUO-98-02-26 The ceiling in the B-1 wing NDA Laboratory is provided with a mixture of solid ceiling panels and foam melt-out panels. This arrangement will impair the sprinkler system in the laboratory in the event of a fire.
- DI-EUO-98-02-28 The June 8, 1994, Fire Protection Equivalency granted to Y-12 for reduced fire system test, maintenance and inspection.

WEAKNESSES:

- Shift-manning for fire response may be insufficient. The Y-12 Plant needs assessment indicates 10 firemen are required, which are two more than currently required on shift. These additional personnel are provided by the common response plan; however, this plan has not been exercised.
- Implementation of the combustible control program is inconsistent.
- Sprinkler system operating pressures are based on "code of record," and presence of combustible liquids may require additional capacity.
- The Training Manager for the Fire Department is not a qualified position as required by DOE Order 5480.7A.
- Fire Department NFPA training is not tracked to ensure all personnel are trained.
- There is a lack of an overall operability definition for non-LCO fire systems.
- A review of emergency light testing in EUO facilities indicates that the testing is not being performed in accordance with Procedure Y50-35-MD-2878.
- Review of the Y-12 *Enriched Uranium Operations (EUO) Compliance Assessment Report*, dated July 11, 1997, indicated that the fire protection assessment was incomplete and that the conclusion was not supported by the assessment activity.

3.1.6 Maintenance (MT)

The objective of this functional area review was to verify that LMES has an adequate Maintenance Program that is in accordance with DOE requirements and that has sufficiently trained personnel and facilities to support restart of EUO. The review was divided into three CRADS that, in turn, were subdivided into a total of 10 criteria. The review was made of records, by observations of work being performed, and interview of personnel. Since maintenance is a service organization and performs work at the request of EUO, most responsibilities for determining safety status and arranging permits belong to EUO. Interface agreements and procedures were also reviewed. The MJRs and

the associated work packages describe all aspects of work that are being performed. A sample of these, overall work control, and interfaces with other organizations were also reviewed. Two areas that were weak early in the review were identified and strengthened to the point that they will be reviewed in the future as part of the ongoing oversight of the Maintenance Program. These were related to planning and controlling jobs and interface between Operations and Maintenance Organizations. In addition, job hazard analyses have been expanded and integrated into the earlier part of the job planning process.

In summary, the Maintenance Program is in place and is sufficiently implemented to support start-up of EUO and to maintain safety systems and safety support systems. Deficiencies and weaknesses identified during this functional area review are listed below.

DEFICIENCIES:

Prerestart

- DI-EUO-97-11-02 The E-wing Baghouse filter replacement preparation and work planning activities were unsatisfactory. Problems included: Occupational Safety Work Permit (OSWP) not completed for actual job conditions, several workers had not completed required training, security precautions were not discussed, operations and maintenance had not coordinated job functions, required personnel protective equipment was not to be worn, no surrogate filters were being handled, lockout/tagout issues had not been resolved and radiological tenting was not in place.
- DI-EUO-98-04-07 EUO's classification for calibration recall evaluation forms (2290's) for Building 9212 E-wing casting equipment classify numerous items incorrectly.
- DI-EUO-98-04-13 One of the acceptance criteria for the Stack 3 HEPA filter test was satisfied using an uncalibrated instrument.

Postrestart

DI-EUO-98-04-10 Maintenance efforts in EUO are in a schedule driven condition at present and there is no evidence that the corrective maintenance program, present in the rest of Y-12 and required by DOE Order 4330.4B, is being used.

WEAKNESSES:

- Maintenance has been performed requiring replacement parts using Deficiency Reports (DR). These DRs are the controlling document in several MJRs that are intended to support testing and minor maintenance associated with that evolution. However, traceability to ensure correct application of parts was lost in many instances because the DRs did not require the rigor normally associated with MJRs or Job Package Revision Forms.

3.1.7 Management Systems (MS)

The objectives of this functional area were to verify the EUO process for identifying, tracking, and addressing issues and recommendations which resulted from audits, surveillances, and assessments; to evaluate the LMES readiness-determination process developed and implemented in ascertaining EUO's state of readiness to resume operations; to evaluate EUO's S/RID review process and results; to evaluate EUO's approach to safety and its importance in operations; to evaluate EUO's restart organization including roles, responsibilities and reporting relationships; evaluate the status of EUO's implementation of DOE Order 232.1, *Occurrence Reporting*; and to evaluate the adequacy of EUO's start-up test program. The review was divided into seven major areas each with its own CRAD. The results of each review are highlighted below.

The review of CRAD MS-1 comprised an evaluation on the process and programs which are used to identify, evaluate, and resolve deficiencies and recommendations made by oversight groups, official review teams, audit organizations and the operating contractor. The review included evaluation of the adequacy and effectiveness of the process and program and interviews and discussions with personnel responsible for the development and execution of the program.

The EUO has implemented two processes to track and address issues. These are the deficiency-reporting system and the LMES issues management process. However, during the initiative to place EUO in a state of

readiness to resume operations, LMES developed and implemented the PBR. At the conclusion of all work activities deemed necessary for restart of any specific process system, the PBR management would conduct a Management Internal Assessment (MIA). Issues and deficiencies identified from the MIAs were tracked in a database specific to the PBR organization of which numerous items remained open at the time the process system was turned over to the EUO. During this evaluation, five deficiencies and one weakness were identified.

For CRAD MS-2, the review evaluated the contractor's "Readiness Determination Process", which includes the MSA and the corporate independent ORR. A verification of the adequacy of the MSA and ORR to ensure the readiness of hardware, personnel, and administrative and management programs for safe operations.

MSA

The MSA was executed under the line management of EUO to establish the state of EUO readiness, as a verification activity, that EUO was ready to begin the ORR. The MSA was executed by an independent team of individuals who performed activities comprised of interviews, document reviews, and field observations. A description of the MSA is defined in Y/MA-7329, *Enriched Uranium Operations Resumption, Phase A Management Self-Assessment (MSA) Guidelines*, and is comprised of a five-step process which includes a Process Readiness Assessment, Qualification Area Assessments, Operational Assessments, Evidence Reviews and a Closure Review.

Process readiness assessments (PRA) and qualification area assessments were performed as under the administrative guidance of Y/MA-7251, *Enriched Uranium Operations Process-Based Restart Management Internal Assessment Guide*, as MIAs. These assessments were performed for each process system to verify that safety requirements in the Criticality Safety Requirement (CSR), Operational Safety Requirement (OSR), and Basis for BIO documents were incorporated into the process procedures, drawings, and postings as appropriate. These assessments also verified that the work on each process was completed to establish the system in a state of operational status. This review included both maintenance and modification activities. These assessments finally verified that evidence existed to document the completion of preparations and tasks defined for restart. Qualification area assessments verified that training was performed to show that personnel in each qualification area met the requirements of the Training and Qualification Program Description. Results of these assessments were documented, using

appropriate forms from the MSA Guide, and were filed in the EUO Document Management Center.

Following completion of the PRA's and Qualification Area Assessment for all process systems and activities required for Phase A1 restart, LMES performed Operational Assessments (OA). These reviews consisted of observations by assessors of EUO operations personnel performance of drills, exercises, level of knowledge interviews, and safety basis. It included assessments of support organizations and was also used to fulfil the LMES commitment to perform a conduct of operations assessment.

As part of the review of LMES' readiness process, corrective actions and closures of MSA findings were evaluated by the YSO. LMES initially developed CAPs for their MSA findings and proceeded to correct the deficiency, rather than expending the time to produce a CAP. Subsequently, LMES developed CAPs for those MSA findings that were not closed and performed a verification on MSA findings that were closed without a CAP. YSO is in the process of reviewing these plans. At the time of issuance of this report, the review was in progress, and it will be completed with all identified prerestart deficiencies closed before authorization to resume Phase A1 is granted by DOE.

The scope of the LMES MSA was then determined as adequate to warrant the start of the independent ORR.

ORR

An ORR was performed in accordance with the guidance provided in the LMES ORR Implementation Plan. This plan established the depth and breadth of the review required by DOE Order 425.1. The review was based on evaluating the 20 Core Requirements from this Order, as subdivided into 36 Core Objectives, which was described in DOE-STD-3006-95, *Planning and Conduct of Operational Readiness Reviews (ORR)*. Core objectives included in the review were CO-1 through CO-29 and CO-34 through CO-36. These core objectives were subdivided (CO-1, -2, -3, and -4); Modifications (CO-5, -6, -8, and -15); Surveillances (CO-10, -11, and -12); Operations (CO-17, -18, and -19); Procedures (CO-7 and -9); Drills (CO-21 and -22); Startup Program (CO-28); Training and Qualification (CO-13, -14, -16, -23, -35, and -36); Management (CO-20, -24, -25, -26, -27, -29, and -34).

In reviewing the team member qualification summaries contained in the LMES ORR Implementation Plan, all members who evaluated operational activities have backgrounds and expertise to serve as team members on the LMES ORR team for Operations. The team members displayed a professional, technical expertise in their assessment activities during the first week of the LMES ORR. The team members appear to have adequate independence from the EUO activities that were assessed.

After approximately one week into the ORR, the Team Manager collected all evidence produced by the members and, based on this evidence, concluded that the facility had not achieved a state of readiness to proceed with an ORR. Six major issues were identified, ranging from an immature mentor program to problems with the procedure V&V process and to Operations not in a state of readiness for the ORR team to observe a full range of operator knowledge. The team was recalled 4 weeks later by the facility to resume their review.

A total of 38 findings were identified by the LMES ORR team. Of this total, 28 were prerestart and 10 were postrestart. The conclusion of the LMES ORR Team was "Phase A1 is not ready for restart due to lack of management commitment to rigor and formality of operations." On the positive side, the ORR Team noted that the EUO operators can perform safely and efficiently if given the right "tools" such as good procedures, management guidance, and sound programs. The corrective actions taken to address the prerestart findings will be reviewed by the ORR Team to verify closure of the issue.

The corrective actions taken to address the prerestart deficiencies were reviewed by the appropriate YSO SMEs and determined to be adequate to address the issue identified. LMES identified additional actions to prevent recurrence and captured these actions in postrestart corrective action plans in some cases. The YSO intends to verify closure of LMES ORR prerestart findings upon closure by LMES.

The compensatory measures identified in the LMES readiness-to-proceed letter were reviewed for adequacy and accuracy. The letter identified a list of formal compensatory measures for deficient conditions in EUO. The letter identified 23 compensatory measures for fire protection deficiencies, 2 for conduct of operations, 1 for the Quality Assurance Program, 2 for inaudibility of the CAAS system, 1 for deficient material condition, 8 for OSHA deficiencies, and 1 for the emergency 911 problems. As a result of the YSO review, it was determined that not all compensatory measures were implemented when the readiness-to-proceed letter was transmitted to DOE. The YSO will continue to evaluate the full implementation of the defined compensatory measures.

The review included a review of the program for control of the compensatory measures that would be adequate to ensure the compensatory measures will be maintained following restart. LMES intends to control compensatory measures with a EUO Standing Order that identifies the method for development, documentation, approval, implementation, and removal of the compensatory measures in EUO. The LMES readiness-to-proceed letter also identified the actions necessary to remove the compensatory measures. The actions for removal for compensatory measures were reviewed and determined to be adequate.

The review of CRAD MS-3 evaluated whether the process and program for performing S/RID reviews in EUO. The review did not evaluate specific results of the S/RID reviews, noting that these results are discussed within the body of this report for each functional area. Results of this review concluded that a formal program has been established that ensures that the requirements of the S/RIDs are identified and evaluated for compliance.

The review of CRAD MS-4 evaluated the establishment of a program to promote a sitewide safety culture. The review included evaluation of the site programs that actively promote safety through a broad range of activities, including but not limited to safety bulletins, lessons learned briefings, and/or employee concerns.

The safety culture at the Y-12 Plant is influenced by many factors. During the review, five of these influential factors were evaluated. One factor that was evaluated was the Lockheed Martin Energy Systems, Inc. (LMES) document, *Policy and Procedures* SH-100, Rev. 0. This Policy and Procedures Manual for LMES, which was revised on April 9, 1997, is current and up to date. Another factor evaluated was the *Employee Safety and Health Handbook*, which is given to all new hires. The last revision of this handbook was in 1990, which needs to be updated. The third evaluated factor was safety bulletins. These safety bulletins have a positive effect upon the safety culture. A sitewide safety bulletin is distributed as needed, and EUO distributes safety bulletins quarterly to all personnel at the EUO safety meetings. The subject matter of the bulletins is determined by management, and there are no written procedures on the issuance of these bulletins.

The fourth evaluated factor was procedures. These procedures must be followed to control the work activity and to promote safety. Two cases were identified in which employees failed to follow the procedures for the control of hazardous energy.

The last factor that was evaluated was the status of the implementation of the Integrated Safety Management Systems (ISMS). Site Safety and Health personnel have a good technical base and the necessary experience needed to promote the programs necessary to achieve a positive attitude toward working safely. The EUO management has endorsed the programs that are necessary to possess the proper safety culture, but there appear to be some impairments in that culture being transferred from management to the work force.

For CRAD MS-5, the review evaluated whether the functions, assignments, responsibilities, and reporting relationships are clearly defined and implemented. The review included the evaluation of the EUO organizational charts that define the management and operating structure. Also, interviews and discussions with supervisors and management personnel were conducted to determine if the organizational structure was effectively implemented.

LMES developed a new organizational structure to support EUO restart. This included establishing the PBR organization with the responsibility of making preparations for equipment and process restart. This organization is separate from the EUO operating staff, which is responsible for normal facility operations. Following restart of Phase A1, it is expected that the PBR organization will continue with restart preparations for Phases A2 and B, while the EUO staff operates the Phase A1 processes. The EUO-operating staff includes facility management personnel, shift managers, shift supervisors, operators, and a large support organization to perform engineering, maintenance, health and safety, quality assurance, and training functions.

The review of CRAD MS-6 evaluated the implementation status of DOE Order 232.1, "Occurrence Reporting," and associated S/RID for adequacy and to verify that nonconformance items have been addressed.

The order compliance package for DOE Order 232.1 was reviewed, along with the active Request For Approval (RFA) on this order. Interviews of LMES managers responsible for implementation of the program were interviewed, and a random sample of four occurrence reports, dated from 1995 to the present, were selected for review.

The DOE-approved RFA is applicable to the Y-12 Plant and does not identify any compensatory measures. The four final occurrence reports for the EUO Complex, which were selected as a sample, were found to be effectively implemented. These reports were reviewed and discussed with the DOE EUO Facility Representative who confirmed the adequacy of the implementation through routine facility observations. The results of

the evaluation of order implementation status and S/RID compliance proved acceptable in meeting the stated criteria; however, the requirements of DOE Order 232.1 are not fully implemented. This was documented in the EUO Appraisal Form OP-3 of the Conduct of Operations functional area, which evaluated occurrence reporting as part of Conduct of Operations Program implementation. Weaknesses were identified and documented as part of the OP-3 evaluation. The RFA was found to accurately reflect the noncompliances with a defined schedule for implementation.

The review of CRAD MS-7 evaluated whether EUO had developed an adequate start-up test program for return to normal operations, including verification of equipment operability, viability of procedures, and adequacy of operator training. The review included evaluating the EUO Restart Plan that defines the process for oversight of the transition to normal operations, following completion of the ORR and restart approval. Also, the process used to evaluate the adequacy of equipment operability during the restart program was reviewed.

LMES prepared the EUO Restart Plan to define how management will oversee the transition to routine operations following restart approval. The plan requires the use of monitors and additional management oversight during the initial start-up of complex operations involving special nuclear material. These requirements are intended to ensure process equipment is operating correctly and facility operators are capable of performing their duties during the start-up. A formal test program was used to verify the adequacy of equipment operability during the EUO restart. Each major process and piece of equipment planned to be operated following the Phase A1 restart was tested, using a formal test plan. Equipment deficiencies noted during the testing were documented and scheduled for repair.

In summary, the programs, processes, and performance of activities required to satisfy the acceptance criteria associated with each review activity contained within the Management Systems functional area are established, implemented, and executed adequately to support operations for Phase A1 restart upon correction of the prerestart deficiencies. Deficiencies and weaknesses identified during this functional area review are listed below.

DEFICIENCIES:

Prerestart

- DI-EUO-98-02-11 Lockout/Tagout Procedure Violations/Failure to follow established procedures: Deficiencies exist with the use of single-source lock-out devices that provide positive protection of condition-point isolation.
- DI-EUO-98-03-04 EUO Startup Plan is not fully adequate in defining an adequate process for management oversight of the transition to normal operations following completion of the ORR completion and restart approval.
- DI-EUO-98-03-05 The operating organization defined by the EUO Organization Manual does not clearly demonstrate that an adequate management structure is in place for EUO.
- DI-EUO-98-04-12 All deficiencies identified in EUO assessment review reports are not being tracked in accordance with the requirements of QA-312, Lockheed Martin Energy Systems, Inc., Management Control Procedure, *Issue Management Program*, Revision 1, dated June 11, 1997, nor have they been evaluated to determine if they require resolution prior to the restart of EUO.

Postrestart

- DI-EUO-98-02-14 The existing Employee Concerns Program (EO-156) that is in place at the Y-12 Site is not being used as it was designed. Interviews with EUO personnel indicate that they are not aware of this specific program. There does not appear to be any method in place to train or to inform personnel of this program or to teach them how it can be used.
- DI-EUO-98-03-25 MIA deficiencies, which are not scheduled for resolution prior to Phase A1 restart should be tracked within Energy Systems Action Management System (ESAMS) as required by QA-312, DOE Order 425.1, Core Requirement 6, and communicated by the EUO Issues Manager.

- DI-EUO-98-04-01 Inadequacies in the binning criteria used to categorize MIA deficiencies resulted in PBR's failure to properly classify 211 MIA deficiencies as requiring resolution prior to Phase A restart.
- DI-EUO-98-04-02 Failure to formally define actions to resolve MSA deficiencies, action to prevent recurrence, and root cause was identified as a violation of QA-312 and DOE Order 5700.6C, *Quality Assurance*, Criterion 9 and 10.
- DI-EUO-98-04-03 The prerestart/postrestart screening criteria used to evaluate deficiency reports was determined to be inadequate in addressing the significance of issues not involving hardware or equipment problems. Explanations provided to justify the postrestart classification of DRs do not adequately address the health and safety concerns reflected in the description of the issue. In some cases justification was not provided and DRs are listed as post-restart but marked as prerestart.

WEAKNESSES

- The EUO Organization Manual needs to be revised to accurately reflect the latest changes in ownership and responsibility of the Deficiency Reporting System.
- The LMES ORR Team failed to recognize the need to review radiological control, fire protection, industrial safety, and maintenance as within the scope of the independent ORR.
- One Operations assessor was not as aggressive in finding problems and did not communicate his concerns well during the daily team meetings.
- During the first-week review, the reviewer of criticality safety was ineffective in communicating his concerns to the Team Leader and did not complete any lines of inquiry. Marked improvements in his assessment and communications methods were observed during the second week of review.
- A list of lessons learned was not included in the final report as required by the DOE Order 425.1 and the LMES ORR Implementation Plan. This is considered a weakness because the addition of lessons learned will not change the results of the review.

3.1.8 Nuclear Criticality Safety (CS)

The review of the LMES Nuclear Criticality Safety Program for restart of EUO consisted of two CRADs, NS-4 and NS-5, for DOE Order 5480.24, *Nuclear Criticality Safety*.

The objective of NS-4 is to ensure a Criticality Safety Program is established, sufficient numbers of qualified personnel are provided, and adequate facilities and equipment are available to ensure criticality safety support services are adequate for safe operations.

Criteria

- A program is established and functioning to provide criticality safety support to the operations organization. Adequate numbers of qualified staff are available to provide support (DOE Order 5480.24 para. 7.c.; DOE Order 5480.19, Chapters II and III).
- CSRs are implemented in facility operating procedures. (DOE Order 5480.24, para. 7; DOE Order 5480.19, Chapter XVII). A total of one postrestart deficiency and four post restart weaknesses were discovered for NS-4 according to the following discussion.

The first criterion was evaluated in a September 30, 1997, in a report by G. R. Goebel, entitled "DOE Quarterly Surveillance of the Nuclear Criticality Safety Organization (NCSO) Training and Qualification Program at the Y-12 Site." The report documented in accordance with YSO-1.9, *Master Assessment*, included a correlation of the NCSO program to the S/RIDs and DNFSB Recommendation 97-2 where the focus was the quality and adequacy of the Nuclear Criticality Safety (NCS) training and qualification programs for the evaluators, reviewers and mentors. The report concludes that the NCSO continues to improve the NCS qualification program, and that the program satisfies the majority of the applicable criteria with no deficiencies noted. Four weaknesses were identified (1) according to Y/DD-587, *List of Qualified Personnel*, dated September 9, 1997, Revision 22, some reviewers are not qualified to do evaluations; (2) there is a lack of consistency in the usage and definition of the mentoring function; (3) presently, no one is assigned the responsibility for updating the critical mass database; and (4) there is no formal training of NCS personnel on how to access the critical mass database.

The second criterion was evaluated by review of 11 CSRs chosen from Table A-1, "Phase A Processes," of the Operational Readiness Review Plan of Action for EUO Restart Phase A, Revision 2, dated January 1998. In

conducting the review, all documents were obtained from the EUO Doc Management Center (DMC). The Electronic Information Content Management System (EICMS) was used to obtain the latest list of approved and/or implemented EUO CSRs available as of February 13, 1998, when this review was performed. The results of the review indicate that for all CSRs (11 of the 11) which have been implemented (i.e.; listed as "effective" on EICMS) that the results were adequate; but for the CSRs (other 5 of 11 evaluated) not implemented (i.e.; listed as "approved" on EICMS, not yet "effective") that results were not adequate. The implementation problems discovered were not caused by NCSO and cannot be fixed by NCSO but these are the responsibility of EUO operations to implement via their procedures. However, it should be noted that the EICMS database clearly indicates the implementation status. As of February 13, 1998 (the date of this review) EICMS indicates that of the 62 EUO CSRs, 49 were effective, and 13 were approved but not yet effective.

The objective of NS-5 is to ensure an adequate implementation status of DOE Order 5480.24 and of associated S/RID is adequate for operations. This would indicate that all noncompliance items have been addressed. The criteria used to judge adequacy of meeting the objective core requirement are that all noncompliance issues are adequately addressed by DOE-approved CSA or exemptions, the CSAs include an adequate technical basis and schedule for attaining compliance, and adequate compensatory measures are specified in the CSAs, as necessary, and have been effectively implemented. A total of two postrestart deficiencies were discovered for NS-5 according to the following discussion.

In an intensive review of the DOE Order 5480.24 implementation, all applicable S/RIDs, CSAs, exemptions, and compensatory measures were conducted. Additionally, several input documents to an LMES Y-12 Programmatic Assessment Report dated October 31, 1997, were also reviewed, and several personnel reviews were conducted. As a result of this effort two deficiencies were discovered. The first finding dealt with storage of fissile materials given adequate consideration for seismic analysis. This finding is documented on ESAMS (I0016999), which concludes that because all corrective actions are now in place that compensatory measures are required. These corrective actions involve the actual on-the-floor fixes, such as locking closed birdcages, installing doors with locks on storage cabinets, and several other measures. The second finding is related to fire fighting in areas containing fissile material. DOE Order 5480.24 requires a DOE-approved safety analysis fully documenting the basis for the fire-fighting guidelines be in place. While the guidelines are in place, DOE approval has not been obtained on this plant level document. The newer DOE Order 420.1 uses the same requirement language as DOE Order 5480.24, except

that it does not require "DOE approval" of the guidelines. This was deemed to be desirable by both LMES and YSO so that an S/RIDs change is being processed to replace the DOE Order 5480.24 language with the DOE Order 420.1 language. Deficiencies and weaknesses identified during this functional area review are listed below:

DEFICIENCIES:

Postrestart

DI-EUO-98-03-17 The following DOE Order 5480.24, Chapter 7, Section f, and LMES S/RIDs requirement have not been implemented:

"The contractor criticality safety program for nuclear facilities shall include the following requirements: Guidelines for Fire Fighting. . . . The basis for the guidelines shall be fully documented in a DOE-approved Safety Analysis."

WEAKNESSES:

- According to Y/DD-587, some reviewers are not qualified to do evaluations.
- There is a lack of consistency in the usage and definition of the mentoring function.
- Presently, no one is assigned the responsibility for updating the critical mass database.
- There is no formal training of NCS personnel on how to access the critical mass database.

3.1.9 Nuclear Facility Safety (NS)

The Nuclear Facility Safety functional area review consisted of five CRADS. NS-1 ensured that Facility Safety Documentation is in place that describes the safety envelope of the facility. The safety documentation should characterize the hazards/risks associated with the facility and should identify mitigate measures (systems, procedures, administrative controls, etc.) that protect workers and the public from those hazards/risks. BIOs and OSRs are currently approved for both Buildings 9212 and 9215. The safety documentation in general is adequate. The safety basis appropriately addresses the hazards associated with the operations. The concerns that exist with the facility safety basis

documentation do not present unacceptable risk. However, continued progression must be made to identify and correct inconsistencies and inaccuracies within the safety basis.

The review of NS-2 evaluated whether a program is in place to confirm and periodically reconfirm the condition and operability of safety systems, including safety-related process systems and safety-related utility systems. This includes examinations of records of tests and calibrations of the safety system and other instruments monitoring LCO or that satisfy OSRs.

The review of NS-3 evaluated the adequacy and correctness of safety limits for operating and maintaining the designated process systems and utility systems.

The review of NS-5 evaluated whether the implementation status of DOE Orders 5480.22 and 5480.23 and of associated S/RID is adequate for operations. Noncompliance items have been addressed.

The review of NS-6 evaluated whether the facility systems, as-built and as affected by facility modifications, are consistent with the description of the facility, procedures, and accident analysis included in the safety basis. The USQ program has made great progress.

These functional areas will continued to be scrutinized in Phases A2 and B due to impending revisions to correct noted inaccuracies. The satisfactory completion of the DOE-approved corrective action plans for the deficiencies noted below allows LMES to proceed with resumption activities associated with Phase A1. Deficiencies and weaknesses identified during the review of this functional area are listed below.

DEFICIENCIES:

Prerestart

- | | |
|-----------------|---|
| DI-EUO-97-12-01 | The Building 9215 OSRs were found to have two deficiencies that must be corrected prior to resumptions of EUO processes. (Update criticality safety analyses and HEPA performance criteria) |
| DI-EUO-97-12-09 | The Building 9212 OSRs were found to have two deficiencies that must be corrected prior to resumption of EUO processes. (Design Features for Safety and applicable standards) |

- DI-EUO-97-12-11 The Building 9215 BIO was found to have two deficiencies that must be corrected prior to resumption of EUO processes. (Updated criticality safety analyses and FHA evaluation)
- DI-EUO-98-01-09 Implementation of OSR-related filter changeout requirements (for criticality concerns) is inadequately understood by EUO personnel who are associated with this activity and/or responsible for ensuring compliance with this requirement. Based on discussion with 9212 and 9215 Operations personnel, it is not clear which surveillance activity, gamma monitoring or filter d/p monitoring (or combination of these two, satisfies the OSR requirement.
- DI-EUO-98-01-10 The surveillance implementation requirements of Y53-35-TP-1900 have not been formally evaluated and documented, as required by Y10-102. Stack 3 HEPA filter were last tested satisfactorily on May 29, 1997, utilizing MJR work instructions prior to issuance of Procedure Y53-35-TP-1900.
- DI-EUO-98-01-11 OSR Administrative Controls section 5.8.13 is not adequately implemented by the Initial Testing and In-Service Surveillance (IT&ISS) Program Description, Y/MA-7345, since the program description does not include the required program elements.
- DI-EUO-98-03-08 The Safety Evaluation Report for the Building 9215 OSR noted one condition concerning the applicability and operability of Sprinkler Systems Nos. 1, 2, and 3.
- DI-EUO-98-03-09 The USQDs reviewed had varying levels of adequacy concerning the justifications for determination of positive or negative USQ. Several USQDs contained justification that were just restatements of the questions asked. Justification must be technically adequate and provide a strong rationale.
- DI-EUO-98-03-10 None of the USQDs or screening reviewed specified any AB pending files as reference documents for their review.

Postrestart

- DI-EUO-97-12-12 The Building 9215 BIO was found to have one deficiency that must be corrected post-resumption. (Seismic analysis)
- DI-EUO-98-03-16 The review of the OSRs for Buildings 9212 and 9215 noted that the "Administrative Controls" section needs to be rewritten to better describe what are the needed elements of the safety management programs to perform their safety function per the OSRs.
- DI-EUO-98-05-01 The EUO BIOs must update Table 6.1 to reflect what the Chapter 5 safety analysis describes as the necessary control.
- Y/MA-7291 POST The SER , Revision 1 for the 9215 OSR notes to reference fire protection program applicable requirements document and develop a Limiting Condition of Operation for the Stack 3 HEPA filters.

WEAKNESSES:

- The review for the BIO for Buildings 9212 and 9215 noted that Chapter 2, or both BIOs, was not always representative of actual facility design and processes.
- Calibration of safety equipment is not being adequately performed.
- Training and qualification of calibration personnel is inadequate or nonexistent.
- Rigorous and formally controlled procedures are not existent for all safety system surveillance requirements.
- A number of procedural errors were identified during this assessment of the Nuclear Safety SRIDs for DOE Orders 5480.22, 5480.23, and 5480.21.
- The program has been dynamic in nature and the procedures have not been able to keep up with the implementation of the orders.
- The AB documents reference contained no section numbers reviewed as required by Y70-809.

- The general level of understanding of EUO OSRs on the part of Site Management Services Personnel is less than adequate.
- All of the USQDs and screening reviewed contained references to appropriate AB documents but the majority of them failed to list the applicable sections of those AB documents.

3.1.10 Occupational Safety and Health Administration (OS)

The objective of the review of this area was to determine whether occupational safety and industrial hygiene programs are established, whether sufficient numbers of qualified personnel are provided, and whether adequate facilities and equipment are available to ensure that services are adequate for safe operations. The review verified that occupational safety and industrial hygiene programs are established, sufficient numbers of qualified personnel are provided, and adequate facilities and equipment are available to ensure that services are adequate for safe operation; that the level of knowledge of operations-support personnel is adequate, based upon the reviews of examinations and examination results and selected interviews of operations-support personnel; and that the implementation status of DOE Order 440.1 and the associated S/RID is adequate for operations.

In summary, the objectives of the Occupational Safety and Industrial Hygiene and the required criteria are in place for EUO and will support safe operations, when identified prerestart deficiencies are corrected. Deficiencies and weaknesses identified during this functional area review are listed below.

DEFICIENCIES:

Prerestart

- | | |
|-----------------|---|
| DI-EUO-97-10-01 | A deficiency exists in the abatement of identified hazards and the implementation of an interim process to address serious safety and health hazards, prior to final abatement. |
| DI-EUO-97-12-02 | A deficiency exists in the Confined Space Program. LMES Procedure Y70-750 has a definition of confined space that is less stringent than the OSHA requirements. |
| DI-EUO-97-12-05 | The identified OSHA-type deficiencies need to be corrected, in accordance with the Abatement Schedule. |

Various hazard communication labeling deficiencies were identified in the E-Wing Basement in violation of 29 CFR 1910.1200. Several hazard communication deficiencies were identified in the unannounced OSHA inspection.

Postrestart

DI-EUO-97-12-10 The current job hazard analysis process, as practiced by EUO Operations personnel for maintenance activities, is inadequate. No process exists for Operations personnel involved in requesting maintenance work to identify hazards and necessary controls and to provide this information to the Maintenance Organization.

WEAKNESSES:

- Deficient "ready-to-use" hand tools/equipment and "inspection-period-expired" equipment were intermixed with acceptable "ready-to-use" equipment. The MK-Ferguson equipment was in a large work box behind Motor-Control Center S230. The 29 CFR 1910.242 requires that "each employer shall be responsible for safe condition of tools and equipment used by employees."
- The job description titles do not match the organizational chart titles, and the Charter of Responsibility, Accountability, and Authority does not adequately reflect the current job assignments.
- The formal Training and Qualification Program for Industrial Hygiene Technicians should be updated to ensure that personnel responsibilities and functions are clearly defined and effectively implemented.
- Weaknesses exist in the timely submittal of Corrective Action Plans (CAPs) to correct the identified DOE Safety and Health deficiencies.
- Several nylon and wire rope slings located in two portions of the basement did not have evidence of an annual inspection check as required by ANSI B30.9 and 29 CFR 1910.184. All hoisting equipment identified had expired inspection dates.

3.1.11 Packaging and Transportation (PK)

The objectives of this functional area review were to verify that the level of knowledge of operations and operations-support personnel is adequate to perform packaging and transportation operations safely and that adequate operating procedures are in place to ensure compliant, safe transportation of enriched material both on and off site.

Operating procedures implementing applicable transportation safety requirements for onsite and offsite movement of materials were reviewed for accuracy and completeness. The documents reviewed, although some were still in draft form, reflected the requirements in the current set of regulations. Responsibilities of the various groups, (i.e.; criticality safety, EUO, transportation safety) were clearly delineated by procedure. Procedure flow was evaluated to determine the existence of gaps that would result in actions taken causing compliance issues, and none were identified.

During interviews, personnel demonstrated ability to correctly answer technical questions relating to the various packages and shipping operations in which they are involved. Training records were reviewed for all personnel interviewed to determine transportation regulatory training provided. Current level of training was adequate for duties performed.

In summary, the current level of training is adequate for personnel involved in packaging and transportation activities. Upon issuance of the final operating procedures, this functional area will have met the minimum requirements and will have an adequate program in place to make compliant, safe shipments of enriched material. No deficiencies or weaknesses were identified during this review.

DEFICIENCIES:

None were identified.

WEAKNESSES:

None were identified.

3.1.12 Quality Assurance (QA)

The objectives of this functional area review were to verify the implementation status of the EUO Quality Assurance Program as required by Title 10 of the Code of Federal Regulations (CFR) 830.120, Quality

Assurance Rule and DOE Order 5700.6C, *Quality Assurance*. The general purpose of the review was to verify that the DOE-approved quality assurance program has been sufficiently implemented to ensure compliance with the quality assurance program requirements.

The review determined that a QA Program has been established, sufficient numbers of qualified personnel are provided, and adequate facilities and equipment are available to ensure quality assurance services are adequate for safe operations (Core Requirement No. 8). Several poststart deficiencies concerning the management assessment program were identified and are listed below.

The review determined that the level of knowledge of operations-support personnel is adequate, based on reviews of examinations and examination results and selected interviews of operations support personnel. (Core Requirement No. 3)

The review also determined that the implementation status of 10 CFR 830.120 and associated S/RIDs are adequate for operations and that noncompliance issues are being addressed. (Core Requirement No. 7)

WEAKNESSES

- There is currently no one assigned to manage the EUO Management Assessment Program after restart assessment activities are completed and the facilities operational. The type and number of assessments required in order to ensure operations are maintained, as required after restart, have not been determined. Assessment cards for areas other than conduct of operations have not been developed.

3.1.13 Radiological Protection (RP)

The objectives of this functional area review were to verify that the Radiological Control (RADCON) Program is in place to ensure that the facility operations are maintained within the documented Radiological Protection Program (RPP). The review verified that the RPPs are established, sufficient numbers of qualified personnel are provided, and adequate facilities and equipment are available to ensure that operational support services are adequate for safe operations; that the level of knowledge of operations-support personnel is adequate, based upon the reviews of examinations and examination results and selected interviews of operations-support personnel; and that the status of compliance with Title 10, Code of Federal Regulations (CFR), Part 835 (10 CFR 835) and with the appropriate S/RID is adequate for operations.

- RP-1** RPPs are established, sufficient numbers of qualified personnel are provided, and adequate facilities and equipment are available to ensure that operational support services are adequate for safe operations. (Core Requirement No. 8)
- RP-2** Level of knowledge of Operations-support personnel is adequate, based on reviews of examinations and examination results and selected interviews of Operations-support personnel. (Core Requirement No. 3)
- RP-3** The status of compliance with 10 CFR 835 and the appropriate S/RID is adequate for operations. Noncompliance issues have been addressed. (Core Requirement No. 7)

In summary, the Radiological Protection Program is in place for EUO, and operations are being maintained sufficiently within the requirement of the RPP. Twelve weaknesses were identified, and eight have been corrected. These weaknesses are listed below. The following four weaknesses have not been corrected and are considered to be poststart items: YSO-97-10-04; YSO-97-10-09; YSO-97-11-02; and YSO-97-11-03.

DEFICIENCIES:

None were identified.

WEAKNESSES:

- The time required to recover Thermoluminescent Dosimeters (TLDs) from non-LMES Y-12 Plant employees and to assign an exposure for missing TLDs may take up to three months, due to a poor response from the employees' organizations; and the current work/storage location for the 1989-1995 Dosimetry Records is marginally acceptable, and obtaining a more suitable work/storage location should be expedited for the protection of these records, pending their duplication and transfer to a permanent storage location. (YSO-96-12-02 and -03)
- The Radioactive Source Storage Cabinet in the RADCON Area in Building 9212 was not sufficiently controlled to prevent the unauthorized use or removal of accountable radiation sources, which is not in accordance with LMES Procedure Y70-102, *Radiation Source Control*. The control of posted radiological control boundaries are not properly maintained, wherein personnel permit materials to be improperly placed outside, or on, the boundaries, which is not in accordance with LMES Procedure Y70-101, *Transfer and Management of*

Material for Radiological Control, and Y70-117, *Posting and Entry Control*. (YSO-97-03-02 and -03)

- The LMES field investigation process, for the potential internal radiological exposure of employees, needs to be improved. A better definition of investigation levels and a graded approach are needed to increase efficiency and to improve the resource allocation. (YSO-97-04-03)
- LMES Procedure Y/DQ-66, *Y-12 Radiological Control Organization Training Development and Administrative Guide*, needs to be revised to better define the required and necessary training modules. (YSO-97-07-01)
- Improvement is needed by LMES to ensure proper bioassay participation by the workers, as required by the Radiological Work Permit. Based upon the results from interviews that were conducted with LMES Radiological Control Technicians (RCTs) on September 25, 1997, the following items were identified as weaknesses:

Defining and giving examples of Radiological Hold Points;

- RADCON procedural change information;
- general knowledge of air sampling; and
- general knowledge of radiation survey instrumentation.

The use of effective engineering controls, such as High-Efficiency Particulate Air (HEPA) units, is insufficient in Building 9212. This will minimize the risks for airborne excursions that can cause internal uptakes. (YSO-97-10-03,04, and 09)

- On-shift training for the RADCON Emergency Response Organization, which aids in maintaining team readiness, needs improvement. (YSO-97-11-03)
- LMES needs to communicate the "lessons learned" and the continuing training RADCON requirements more efficiently to the MK-Ferguson RADCON Training Organization to ensure the standardization of RADCON practices at the Y-12 Plant. (YSO-97-07-02)

- Two out of the nine Radiological Workers who were interviewed do not have an appropriate level of knowledge with regard to the radiological hazards in their work area, as described on the Radiological Work Permit. (YSO-97-11-02)

3.1.14 Training and Qualification (TQ)

The objectives of this functional area review were to verify that the TQ programs are in place and that sufficient trained and qualified personnel are available to safely resume operations of the EUO PBR Phase A1 systems. Specifically, the review verified that EUO and EUO support organizations have established, documented, and implemented training and qualification programs for personnel required to be qualified or certified under DOE Order 5480.20A, *Personnel Selection, Qualification, Training, and Staffing Requirements at DOE Reactor and Non-Reactor Nuclear Facilities*, dated November 15, 1994. The scope of the review included assessments of training instructors, evaluators, training facilities, program descriptions, program content, program implementation, and retained records. The oversight activities were implemented under six objectives as follows.

TQ-1 A training-support program is established, sufficient numbers of qualified training personnel are provided, and adequate facilities and equipment are available to ensure training and support services are adequate for safe operations.

A training-support program is established within EUO by the Conduct of Training Manual, and a program is being upgraded for the support organizations by the Y10-027 Procedure, *Plant Conduct of Training*. However, readiness of support organizations was based on compliance with training MOU established between EUO and the support organizations, rather than compliance with the Y10-027 procedure because this procedure is not fully implemented and is not scheduled to be fully implemented until after the scheduled EUO restart date. Management of the training for EUO and all EUO support organizations is through training managers or training coordinators assigned to each organization to facilitate organizational activities and the Y-12 Plant Training Manager to lead the training managers and coordinators through training activities that have site-wide impact. It should be noted that several training managers and training coordinators were changed during the EUO PBR effort. This change included three different EUO training managers and two different restart training and procedure managers.

The EUO training staff consists of a combination of career LMES personnel assigned to EUO and of individuals on loan from other LMES organizations, with some previous operations experience, and subcontractor personnel. The on-loan personnel have had training experience at the Y-12 Plant and are typically former operators who have not been in EUO for several years. The subcontractor personnel have had significant training experience at nuclear facilities but no EUO operational experience. No qualified/certified operations personnel were available to support the EUO PBR training and qualification effort (DI-EUO-98-03-26). To compensate for weaknesses in this mix of training staff, management controls were used to limit the areas each trainer could instruct and evaluate.

The controls for classroom training were set by the EUO Training Manager. The controls for training and evaluations in the facility were set by the EUO Training Manager and the Operations Manager. Generally, these controls ensured only people with training in on-the-job training (OJT) or in basic instructor training were used for OJT or classroom training, respectively, and were considered knowledgeable in the area being taught or evaluated. People were considered knowledgeable if they had previous operational experience in the material or were significantly involved in the development of training materials. These people were identified by list and were restricted by qualification areas and as an instructor and/or an evaluator. Observations of OJT, Performance Documentation Checklists (PDCs), and operational evaluations and reviews of instructor records determined that EUO had been performing activities within these controls. However, during the LMES ORR it was determined that the observed evaluators performing General Area Operator (GAO) operational evaluations were on loan from other organizations and were not as familiar with EUO PBR programs and activities as had been expected. It was subsequently determined that they had been performing evaluations for several months, even though they had only been added to the approved list of evaluators two days prior. The LMES ORR team member wrote a prerestart finding on this situation.

The EUO does not have a training facility but has access to several rooms for training use in several buildings within the Y-12 Plant. Training and/or oral boards were observed in Buildings 9212, 9119, 9723-16, and 9711-5. These facilities and available equipment were determined to be satisfactory. OJT, PDCs, and operational evaluations are performed in the facilities at the normal job site.

TQ-2 The TQ programs for operations and operations-support personnel have been established, documented, and implemented.

The EUO operations training and qualification programs are established and documented within the Training and Qualification Program Description Manual for each qualified and certified position in EUO which is required to be completed on a prerestart schedule under the Y-12 Plant Training Implementation Matrix (TIM). The EUO personnel who will be qualified on a postrestart schedule were evaluated for position qualification, and the results were documented on Engineering and Technical Support Qualification Data Forms. These data forms on file are satisfactory but not all EUO personnel working in EUO were included (DI-EUO-98-03-07). Observations of classroom training, OJT, PDCs, and oral boards and administration of written module examination and comprehensive written examinations for qualification and certification have verified program implementation. Reviews of training program files and individual record files verified that retention of records were adequate.

The EUO-support organizations TQ training programs for EUO restart are established by training MOUs between EUO and each of the support organizations. The MOUs cover all personnel required to be qualified or certified under the Y-12 Plant TIM. The MOUs require the support organization to identify EUO tasks, to establish the appropriate TQ to support safe performance of identified tasks, to train and qualify or certify their people, and to provide a list of qualified personnel to the shift manager. Observations of training activities (i.e., classroom, OJT, PDCs and administration of written examinations, reviews of approved task lists and training programs) and a review of qualified personnel lists, TMS reports, and individual training and qualification record files have determined that all support organizations have implemented their MOU agreements, except the Fire Department (DI-EUO-98-02) and Depleted Uranium Organization (DUO) (DI-EUO-98-02-19).

A compliance review of the OJT program was made against Chapter 5 of the *Nuclear Operations Conduct of Operations Manual*. The following deviations were noted.

- OJT training is not performed on shift by operations personnel but by training personnel (DI-EUO-98-03-26).
- OJT is not conducted one-on-one (DI-EUO-98-03-26).
- OJT instructors are not qualified in the operating position in which they provide instruction (DI-EUO-98-03-26).

TQ-3 The TQ programs encompass the range of duties and activities required to be performed.

The TQ programs were established and based on a job-task analysis. Training needs were developed from this analysis. Evidence of this process is included in the Training and Qualification Program Descriptions for all EUO positions. Evidence of this process for the support organizations is on file with the approved training program for EUO restart. However, it has been observed that the maintained task lists are not always up to date (DI-EUO-98-01-12) as a result of operations assigning tasks to qualified/certified personnel that were not considered during the development of the TQ program.

TQ-4 Modifications to the facility have been reviewed for potential impacts on training and qualification. Procedures have been revised to reflect that these modifications and training have been performed to these revised procedures.

The TQ Program includes required reviews of facility modifications and procedure changes to determine their impact on training. This process is dependent upon other Y-12 Plant organizations notifying the training organization when changes are made in order for training personnel to perform a training impact assessment. This process has been working satisfactorily when the training organization receives proper notification of change, but there have been changes identified that the training organization was unaware (DI-EUO-98-03-06). It was also observed that a significant amount of training was performance-based on draft documents or incomplete modifications to maintain a training and qualification schedule. This training is referred to "at-risk" training, which was tracked through final document approval. Evaluations were then performed to determine the training needs, if any, based on the training provided on the draft documents and the differences between the draft and final approved documents. The tracking and disposition of training needs, resulting from this process, was determined to be satisfactory. Training has been verified to be complete for all items being tracked that affect Phase A1 processes.

TQ-5 The implementation status of DOE Order 5480.20A and associated Standard/Requirement Identification Document (S/RID) is adequate for operation. Noncompliance items have been addressed.

DOE Order 5480.20A requires the Management and Operating (M&O) contractor to issue the TIM which requires a listing of all identified actions to fully implement the S/RID requirements. All S/RID requirements are reflected in the TIM, Appendix 3, which makes the TIM the Order Compliance Package for the DOE Order. The TIM has been revised to reflect the current qualified and certified positions at the Y-12 Plant by organization. This revision was approved by DOE in

February 1997. All noncompliances have been identified as actions in the TIM with a defined schedule for closure. This includes both EUO and all organizations supporting EUO operations.

Review of the tracking of these items is done officially in ESAMs; however, the Site Training Manager has developed and uses an internal database that is used by the Training Working Group (TWG) to track issues and actions to closure. All open EUO noncompliances were verified as being tracked with defined, acceptable closure dates. No deficiencies, weaknesses, or observations were noted.

TQ-6 There are sufficient numbers of qualified operators to support safe operations. The technical and management qualifications of contractor personnel for facility operations are adequate.

The EUO has minimum staffing requirements for safety in their OSRs, and minimum staffing requirements for minimum production and full production established outside the OSRs. The EUO minimum staffing requirements for safety are satisfied by the EUO minimum staffing document with some margin in all EUO positions, except the Shift Manager position. The Shift Manager position could be staffed with existing qualified staff at all times but only by depleting their day-shift resources, which LMES has decided not to do (DI-EUO-98-01-01). The support organizations have not established a minimum staff but have trained and qualified sufficient number of personnel to support EUO normal operations, based on historical support needs.

The EUO currently has a sufficient number of trained and qualified/certified to meet the established minimum production staffing requirements; however, many positions are only filled with one person or have to rely upon one or two qualified reliefs. This condition has caused some needed personnel to work a significant number of overtime hours and has caused operations to be suspended because minimum staffing could not be achieved on a particular day. Qualified/certified personnel have also been lost due to job reassignments, not keeping current in the continuing training program, examination failures, and time off. Moreover, some people are qualified/certified in more than one position; consequently, some double-counting is being done in meeting minimum staffing requirements. It is unclear how this will impact operations since the minimum production staffing requirements were not developed from task analysis.

In summary, the TQ programs for the EUO are established and sufficiently implemented to support safe restart and continued operations. LMES has trained and qualified additional personnel since the conclusion of this

assessment. The number of Shift Managers is now sufficient to support all shifts, and the FDO and DUO are now in compliance with their training MOUs. A summary of all deficiencies and weaknesses identified during the review follows. All prerestart deficiencies have been closed. All postrestart deficiencies are either closed or have the approved corrective actions with the specific scheduled dates for completion. Deficiencies and weaknesses identified during this functional area review are listed below.

DEFICIENCIES:

Prerestart

- DI-EUO-98-01-02 The personnel on the Shift Manager's Qualified Personnel List from the Fire Department are not qualified according to TMS.
- DI-EUO-98-01-12 Position task lists are not always updated for changes in job scope.
- DI-EUO-98-02-09 The FMO Qualification Program does not include training on the Y-12 Plant procedure usage policy.
- DI-EUO-98-02-10 DUO has not provided a list of trained Equipment Service machine maintenance support personnel to the Building 9215 Shift Manager.
- DI-EUO-98-03-06 All EUO personnel who have certified or qualified have not completed training on JPA usage.
- DI-EUO-98-03-07 Engineering and Technical Staff Qualification Data Forms have not been completed for all personnel working in EUO.

Postrestart

- DI-EUO-97-11-01 The EUO continuing training programs do not include drills.
- DI-EUO-98-03-26 OJT is not controlled by operations personnel and is performed by training personnel that are not qualified/certified in the positions in which they provide training and evaluations. OJT is seldom provided on a one-on-one basis.

WEAKNESSES:

- Many operators are provisionally qualified because the actual operation of some equipment could not be performed. Independent operation is not allowed until full qualification/certification is achieved.
- Many positions have only one or two qualified and/or certified individuals. This has limited shift work when these individuals do not report to work.
- The production minimum staffing list does not have a documented basis for the number of required personnel. Some people have more than one qualification/certification so one person is being counted to satisfy more than one position's minimum staffing requirement. It is unclear if this will cause a production problem since the minimum staffing requirements are not broken down to the task level.
- The number of personnel who have completed qualification/certification has been fluctuating below and above the minimum staffing requirements as a result of personnel bidding out to new jobs, personnel not remaining current in their continuing training program, retirements, and personnel failing level-of-knowledge examinations administered for the readiness oversight teams. Operations should place more attention on this problem in order to maintain minimum staffing levels.
- Engineering and Technical Staff Qualification Data Form files are not being updated with organization changes.
- TMS records are not being maintained as current, regarding the status of personnel holding provisional qualifications.
- The oral board evaluating B-1 wing supervisors did not meet the requirements for oral board composition as stated in the B-1 Supervisor TQPD.

3.1.15 Waste Management and Environmental Protection (WM)

The objectives of this functional area review were to verify that EUO is in compliance with applicable laws and regulations and that they have a plan to prevent pollution from their facilities. Specifically, the review verified that EUO has adequate documentation that demonstrates that they comply with Resources Conservation Recovery Act (RCRA), Clean Water Act (CWA), Clean Air Act (CAA) and the applicable implementing regulations and permits. The review verified that personnel were

adequately trained and knowledgeable to fulfill their environmental and waste responsibilities. The review also verified that EUO compliance with waste management and environmental protection S/RIDs was adequate for operations. It should be noted that compliance with environmental regulations was maintained throughout the stand-down of operations and that resumption of activities should not impact that compliance stature. There are three CRADs under this functional area.

The first CRAD deals with the facility, adequate staffing and equipment necessary for safe and compliant operations. It specifically dealt with traditional subareas in the environmental area such as compliance with laws, regulations, and permit requirements. For instance, Building 9212 is a permitted RCRA unit and possesses a RCRA Part B Permit that is issued by the State of Tennessee. The requirements of this Permit were reviewed and the facility was walked down to verify compliance. Similar activities were conducted under the CAA permits for the facilities. Building 9212 does not discharge directly through an National Pollutant Discharge Elimination System (NPDES) permit but does contribute indirectly. Discharges were reviewed to ensure that the facility was not contributing to any potential violations. Each waste-generating facility at the Y-12 Plant is required to have a plan for pollution prevention and waste minimization. EUO's plan was reviewed for adequacy and implementation. Procedures for transfer of waste to Waste Management Operations were also reviewed. No deficiencies or findings were found with respect to this CRAD.

The second CRAD deals with operator knowledge and training. Within the requirements of the environmental permits, such as the RCRA Part B, training requirements are spelled out as part of the requirements. All training records required to meet permit requirements were adequate. The training itself was not reviewed as the training is standard and not specific to EUO and was therefore considered outside the scope of this effort. Random interviews with personnel indicated that adequate knowledge is possessed by the operators. Inspection logs and other documentation reviewed for the first CRAD also supports this conclusion. No deficiencies or findings were found with respect to this CRAD.

The third CRAD deals with EUO operations and compliance with S/RIDs. In the waste management and environmental protection functional area, the S/RIDs that are applicable to EUO essentially track with the requirements of applicable laws, regulations, and permits. The exception to this would be the DOE Orders governing low-level and mixed wastes. Verification of compliance with S/RIDs was performed simultaneously with the activities to verify the above CRADs since the requirements are essentially identical. No deficiencies or findings were found with respect to this CRAD.

In summary, the waste management and environmental protection functional area status of EUO operations is considered good with no deficiencies or findings noted. Resumption of activities within EUO will not adversely impact this compliance status. Therefore, with respect to this functional area, EUO is ready to resume operations.

4.0 LESSONS LEARNED

The following lessons learned are from both the DOE YSO line management oversight and assessment of EUO and the lessons learned from the contractor's readiness process. These actions are documented to assist both the DOE and the contractor in the preparations for and the line management assessment of Phases A2 and B portions of the EUO restart effort as well as any future reviews.

4.1 Lessons Learned from the DOE Oversight and Assessment

- The DOE determined that prerestart or concerns made and approved by YSO management must be categorized and transmitted to the contractor as quickly as possible, so the contractor can initiate the proper corrective action in a timely manner.
- Communication and documentation of interpretations of DOE requirements must be done in a timely fashion. For example, if an issue is raised that may involve a violation of the safety basis documentation, the appropriate managers and SMEs should establish a YSO position in a timely manner and should provide appropriate justification for the position. This position and justification should also be appropriately documented.
- There was an advantage in having continuous communications between the Facility Representatives, SMEs, and management in order for DOE to transmit a single position to the contractor and to promote efficient coordination of the review.
- Both line and senior DOE management involvement in planning and executing the restart activities was necessary to ensure that the proper attention is given to decisions that must be made at their level. The DOE determined that constant communication between the contractor and the DOE line management resulted in a better mutual understanding of the issues.

- Ownership and definition of the CRADs, as established in the Oversight and Assessment Plan, belongs to the SMEs assigned to each functional area. SMEs must ensure that the CRADs, which are included in YSO's assessment and oversight activities, is consistent with the scope of the restart.
- YSO management should ensure that expectations are clearly defined and provided to SMEs; for example, the responsibilities of the SMEs should be followed and monitored by management. A periodic feedback on progress should follow subsequently.
- The decision for the commencement of the DOE assessment of programs and/or restart activities was decided, based upon when the contractor declares achievement of a certain level of implementation. By using this approach, a more objective look at an adequate state of readiness resulted.
- A comprehensive oversight and assessment plan, which defines a review scope that correlates to the contractor's restart scope, is essential to performing an adequate review of the contractor's restart activities.
- The DOE determined the more familiar the DOE SMEs are with the processes restarted, the hazards associated with these processes, and a general understanding of the overall operation, the better they understood the contractor's work on these processes. This familiarization included a walk-down conducted by the Facility Representative and the appropriate handouts for reference provided by the YSO Training Manager.
- An internal tracking database proved to be a useful tool to track YSO findings and to produce periodic status reports for the issues management portion of the review. SMEs were given an orientation on the system that helped in the closure process.

4.2 Lessons Learned from the LMES Restart Readiness

- The MSA for Phase A1 was fragmented into several MIAs, and Process Area Assessments, and Qualification Area assessments which lasted over a long period. A more efficient method for performance of an MSA should be to assign a designated group of facility SMEs in the appropriate functional areas, the task of reviewing the facility in a specified period. Typically, this task is the only assignment this team has with instructions to perform a thorough, in-depth review in a 6- to 8-week period. All findings should be documented and tracked accordingly.

- LMES should have one process and a complete listing to track all findings. The process should be reviewed with all affected persons to ensure everyone understands the expectations. Management must ensure that everyone follows this process and that every step in the process is properly documented and tracked. A single list of prerestart and postrestart findings must be developed and constantly checked for accuracy and completeness.
- LMES senior and facility management must periodically monitor and observe activities in the facility, not only from meetings. First-hand observations will allow the managers to appreciate and to deal with problems more efficiently and effectively.
- There needs to be a single strong manager to direct the restart effort from the early determination of restart scope to throughout the preparations and reviews. This was done late in the Phase A1 preparations that caused a loss of time and inefficient use of resources. There also needs to be a strong middle management team directing the day-to-day restart effort.
- The procedure V&V process must be better understood and owned by the Operations Organization. The number of problems with procedures required significant rework because the operators involved in the validation of the procedure did not understand how procedures worked or their role in the review process.
- The contractor's closure process for closure of findings remains weak. Many findings were prematurely closed before the work was completed as noted in an LMES ORR prerestart finding. Further, all finding resolutions should automatically include an analysis for generic implications and the appropriate corrective actions which would prevent recurrence.
- The categorization of LMES findings was inaccurate and did not involve the appropriate responsible individuals for the first review. This was documented in a YSO prerestart finding. The criteria used to categorize were too general to establish the realistic significance of the issue.
- EUO Operations was not sufficiently involved in the PBR process to help preclude rework. This included the methodology employed by PBR to prepare the appropriate documentation, test equipment, and perform maintenance, especially upon turnover of process systems.

- It is recognized that compensatory measures may be required on a limited, short-term basis. Any areas where compensatory measures are needed, such as from the PHA, FHA, or the BIO should be evaluated and documented immediately after formal issue of these type documents.
- Consider plant experience and applicability to the facility; for example, over 2 years ago LMES determined there were serious concerns across the site with emergency lights. This issue was treated at a site level and resulted in installation of many self-testing lights in the EUO Complex. However, the issues were never fully closed across the site or in EUO. The result is the "flashlight rules" that we are using today. Lessons learned from site level can help the facility.
- LMES should do a thorough comparison of the safety basis documents to the programs invoked by the safety basis. YSO determined that the BIO contained elements of LMES programs that did not exist such as hot work, emergency response and drills, and maintenance controls.
- LMES should incorporate lessons learned from all previous restarts since 1995 at the Y-12 Plant to ensure that problems identified in the past are not repeated in the present or future.

5.0 OVERALL CONCLUSION

The overall DOE YSO conclusion, based on the results of this report, is that the EUO Phase A1 processes, personnel, and programs can resume safe operations without undue risk to the health and safety of the public, workers, or environment. This conclusion is subject to a set of conditions to be specified in the authorization to resume operations letter to be sent to LMES after the DOE ORR. These conditions will be necessary due to the continuing weaknesses identified in this report. This conclusion is also contingent upon the adequate closure of the remaining prerestart deficiencies, which are being reviewed by YSO at the time of issuance of this report.

6.0 APPENDICES

- 6.1 Acronyms**
- 6.2 References**
- 6.3 Team List and Functional Area Assignments**
- 6.4 Biographies**

6.1 Acronyms

AHJ	Authority Having Jurisdiction
AOP	Abnormal Operating Procedure
BFEP	Building/Facility Emergency Plan
BIO	Basis for Interim Operations
CAA	Clean Air Act
CAP	Corrective Action Plan
CES	Central Engineering Services
CFR	Code of Federal Regulations
CO	Core Objective
CRAD	Criteria and Review Approach Documents
CSA	Criticality Safety Approval
CSR	Criticality Safety Requirements
CWA	Clean Water Act
DC/RM	Document Control/Records Management
DOE	Department of Energy
DMC	Document Management Center
DNFSB	Defense Nuclear Facilities Safety Board
DP	Defense Program
DR	Deficiency Report
DRB	Deficiency Review Board
DUO	Depleted Uranium Operations
ENS	Emergency Notification System
EOP	Emergency Operating Procedure
ESAMS	Energy Systems Action Management System
EUO	Enriched Uranium Operations
FDC	Facility Drill Coordinator
FHA	Fire Hazards Analysis
FMO	Facilities Management Organization
FPO	Fire Protection Organization
GAO	General Area Operator
HEPA	High-Efficiency Particulate Air
ISMS	Integrated Safety Management Systems
IT&ISS	Initial Testing and In-Service Surveillance Program
JPA	Job Performance Aids
LCO	Limited Condition of Operation
LE	Limited External
LMES	Lockheed Martin Energy Systems, Inc.
MAR	Monthly Assessment Report
MEL	Master Equipment List
MIA	Management Internal Assessment
MJR	Maintenance Job Requests
MOU	Memorandum of Understanding
MSA	Management Self-Assessment
NOCOOM	Nuclear Operations Conduct of Operations Manual

NPDES	National Pollutant Discharge Elimination System
OA	Operational Assessments
OJT	On-the-Job Training
ORO	Oak Ridge Operations
ORR	Operational Readiness Review
OSR	Operational Safety Requirements
OSWP	Occupational Safety Work Permit
PA	Public Address
PBR	Process-Based Restart
PDC	Performance Documentation Checklist
POA	Plan of Action
PRA	Process Readiness Assessment
PSS	Plant Shift Superintendent
QA	Quality Assurance
QO	Quality Organization
RA	Readiness Assessment
RADCON	Radiological Control
RCRA	Resources Conservation Recovery Act
RCT	Radiological Control Technician
RFA	Request for Approval
RPP	Radiological Protection Program
RSS	Receipt, Storage, and Shipment
SAR	Safety Analysis Report
SER	Safety Evaluation Report
SOC	Site Operations Center
SME	Subject Matter Expert
S/RID	Standard/Requirement Identification Document
SSC	Structures, Systems, and Components
TIM	Training Implementation Matrix
TLD	Thermoluminescent Dosimeters
TMI	Test, Maintenance, and Inspection
TMS	Training Management System
TWG	Training Working Group
USQ	Unreviewed Safety Question
USQD	Unreviewed Safety Question Determination
V&V	Validation and Verification
YSO	Y-12 Site Office

6.2 References

1. 10 CFR 830.120.
2. 10 CFR 835.
3. 10 CFR 1910.242.
4. 29 CFR 1910.184.
5. 29 CFR 1910.242.
6. 29 CFR 1910.1200.
7. 49 CFR 100-199.
8. DOE Order 151.1, "Comprehensive Emergency Management Systems," September 25, 1995.
9. DOE Order 440.1, "Worker Protection Management for DOE Federal and Contractor Employees," September 30, 1995.
10. DOE Order 460.1A, "Packaging and Transportation Safety," October 2, 1996.
11. DOE N 441.2, "Radiological Protection for DOE Activities," September 19, 1996.
12. DOE Order 232.1A, "Occurrence Reporting and Processing of Operations Information," July 21, 1997.
13. DOE Order 4330.4B, "Maintenance Management Program," February 10, 1994.
14. DOE Order 5400.1, "General Environmental Protection Program," 11/9/88.
15. DOE Order 5400.5, "Radiological Protection of the Public and the Environment," 1/7/93.
16. DOE Order 5480.4, "Environmental Protection, Safety, and Health Protection Standards," 1/7/93.
17. DOE Order 5480.7A, "Fire Protection," February 17, 1993

18. DOE Order 5480.19, "Conduct of Operations Requirements for DOE Facilities," May 18, 1992.
19. DOE Order 5480.20A, "Personnel Selections, Qualifications, and Training Requirements for DOE Nuclear Facilities," November 15, 1994.
20. DOE Order 5480.21, "Unreviewed Safety Questions," December 24, 1991.
21. DOE Order 5480.22, "Technical Safety Requirements," February 25, 1992.
22. DOE Order 5480.23, "Nuclear Safety Analysis Reports," April 30, 1992.
23. DOE Order 5480.24, "Nuclear Criticality Safety," August 12, 1992.
24. DOE Order 5482.1B, "Environment, Safety, and Health Appraisal Program," November 18, 1991.
25. DOE Order 5820.2A, "Radioactive Waste Management," September 26, 1988.
26. DOE Order 425.1, "Startup and Restart of Nuclear Facilities," September 29, 1995.
27. DOE Order 5700.6C, "Quality Assurance", August 21, 1995.
28. DOE Technical Standard 3006-95, "Planning and Conduct of Operational Readiness Reviews," November 1995.
29. DOE "Y-12 Operational Readiness Review Plan of Action for Resumption of Enriched Uranium Operations at the Oak Ridge Y-12 Plant," Rev. 1, January 16, 1998.
30. DOE "Y-12 Site Office Assessment and Oversight Plan," August 27, 1998.
31. Y/AD-623, "Planning for Continuing and Resuming Operations, Oak Ridge Y-12 Plant," April 14, 1995.
32. Y/MA-7309, "Enriched Uranium Operations Mentor Program."
33. Y/MA-7329, Enriched Uranium Operations Resumption Phase A Management Self-Assessment (MSA) Guidelines.

34. Y/MA-7243, "Enriched Uranium Operations (EUO) Restart Plan, Rev. 3, dated October 1997.
35. Y/MA, "Enriched Uranium Operations Process-Based Restart Management Internal Assessment Guide."
36. Y/MA-7367, "Enriched Uranium Operations Startup Plan," January 1998.
37. Y/MA-7373, "Lockheed Martin Energy Systems, Inc., Operational Readiness Review Report for the Enriched Uranium Operations Restart Phase A1 at the Oak Ridge Y-12 Plant," April 1998.
38. Y/DQ-66, "Y-12 Radiological Control Organization Training Development and Administrative Guide"
39. Y/DD-587, "List of Qualified Personnel, Rev. 22, September 9, 1997.
40. YSO Procedure YSO-1.6, "Facility Representative Program," February 11, 1998.
41. YSO Procedure YSO-1.2, "Organization and Responsibilities," November 28, 1997.
42. YSO-1.9, "Master Assessment Plan," March 11, 1998.
43. YSO-2.1, "Technical Qualification Training Program," November 21, 1997.
44. YSO-3.1, "Conduct of Operations," January 2, 1997.
45. YSO-3.2, "Deficiency Processing," June 24, 1996.
46. YSO 3.4, "Occurrence Reporting and Processing of Operations Information," February 3, 1998.
47. YSO-4.1, "Unclassified Document Control and Records Management," February 18, 1998.
48. YSO-5.4.1, "Readiness Assessments," dated October 1, 1996.
49. YSO-5.5, "Tracking and Verification of Internal/External Commitments and Deliverables," Rescinded.
50. YSO-9.2, "Contractor Oversight," February 24, 1998.

51. LMES, "Policy and Procedures SH-100," Rev. 0, April 9, 1997.
52. LMES Management Control Procedure, Issue Management Program," Rev. 1, dated July 11, 1997.
53. LMES "Operational Readiness Review Plan of Action for Enriched Uranium Operations Restart Phase A," Y/MA-7316, Rev. 2, January 1998.

6.3 Team list and Functional Area Assignments

YSO MANAGEMENT

Y-12 Site Manager	-	Robert Spence
Acting Y-12 Site Manager	-	Dale Jackson
Program Management Branch	-	Mark Livesay
Technical Support Branch	-	Dan Hoag
Senior Nuclear Engineer	-	David Wall
Compliance Manager	-	Diane McCarten
Facility Representatives	-	Steve Wellbaum
		Brenda Hawks
		Stan Watkins

FUNCTIONAL AREA	SME	SUPPORT
Conduct of Operations Operations Procedures	Dale Christenson	Frank Poppell Gary Weston
Configuration Management	Dale Christenson	Randy Foust
Emergency Management	John Pearson	N/A
Engineering	Dale Christenson	Randy Foust
Fire Protection	Dan Hoag	Charlie Coones
Management Systems	Mark Sundie	Randy Foust
Maintenance	Andy Stevens	Ron Cook
Nuclear Safety Criticality Safety Facility Safety	Dan Hoag Ed Kendall Sarah Hartson	Tom Tracy John Conlon Sixto Almodovar
OSHA	Jerry Robertson	N/A
Packaging and Transportation	Dana Willaford	N/A
Quality Assurance	Tom Larkin	N/A
Radiological Protection	Jim Douglas	Brad Graves
Training and Qualification	Mark Sundie	Tom Rogers
Waste Management and Environmental Protection	Larry Sparks Susan Morris	Mal Humphries Jim Donnelly

FUNCTIONAL AREA	SME	SUPPORT
Database Management and Deficiency Tracking	Kim Hurd	N/A
Administrative Support	Kay Dutton	Kim Hurd

6.4 Biographies

Sixto T. Almodovar

Sixto T. Almodovar has a B.S. degree, in Engineering with a Nuclear major, from the University of California, Los Angeles (UCLA); Nuclear Engineering Graduate Studies also at UCLA; and Hazardous Materials Management Certificate from the University of California, Santa Cruz (UCSC) Extension Program. He has over 27 years of experience in nuclear safety, systems and risk analysis.

In nuclear criticality safety, Mr. Almodovar has supported, in various positions, several design projects, operating facilities, and operational safety requirements at various DOE and NRC facilities. The highlights of his assignments are:

From October 1997 to the present, Mr. Almodovar has provided support with nuclear criticality to the DOE Y-12 Site Office in the resumption of the Enriched Uranium Operations (EUO).

For 7 years, Mr. Almodovar was on a site assignment as a Nuclear Criticality Safety Engineer in support of the Babcock and Wilcox Naval Nuclear Fuels Division (NNFD) in Lynchburg, Virginia. He performed quality assurance of evaluations performed for others and performed facility walk-downs of the recovery area, created (main frame) KENO Va geometrical models and run streams to support NNFD's manufacturing activities. He supported engineering design activities and Criticality Safety Operating Limits (CSOLs) for Stone and Webster Engineering Corporation's (SWEC) Residue Stabilization and Elimination Project at Rocky Flats Environmental Technology Site (RFETS). He also supported the RFETS site-wide Environmental Impact Statement.

Mr. Almodovar performed Criticality Safety Operating Limits (CSOLs) evaluations for the resumption of the building 707 operations at the EG&G Rocky Flats Plant. He created and ran various PCKENO Va, UNIX KENO Va, and (main frame) KENO Va geometrical models and supported the nuclear criticality Operational Safety Requirements (OSR) effort for the resumption of the Building 771 operations at the DOE Rocky Flats facility. He was an individual technical contributor to the criticality task of the Purex Facility Modification (PFM) project for Fluor Technology Inc. He created (main frame) SCALE IV run streams with KENO IV and KENO Va geometrical models of various FFTF (MOX) and N Reactor fuel configurations, process vessels, and process stream conditions.

Dale E. Christenson

Mr. Christenson received a B.S. degree, in Civil Engineering, from the University of Washington and an M.S. degree, in Civil Engineering, from the University of Maryland. He is a registered Professional Engineer in the State of Maryland. He has 5 years experience in the nuclear operations field. As an officer in the Department of Defense, he served for 8 years in the Naval Nuclear Propulsion Program that is recognized as one of the most respected nuclear programs in the country. While in the U.S. Navy, he served in the Engineering Department for 3 years and was certified to act as an Engineer on-board the U.S. naval vessels with nuclear plants. He joined the Department of Energy (DOE) in 1991 and has been a member of Y-12 Site Office since August 1994. Mr. Christenson has completed the Conduct of Operations assessment training conducted by EM-25. He has also received training on DOE Order 5480.31, *Restart of Nuclear Facilities*. He has been instrumental in the validation of readiness for Receipt, Shipment, and Storage of Special Nuclear Material; Disassembly and Assembly; Quality Evaluation Readiness Assessments at the Y-12 Plant, and the Enriched Uranium Operations.

Ronald J. Cook

Ronald J. Cook has a B. Eng. degree, in Mechanical Engineering, and an M.S. degree, in Nuclear Engineering, from the Ohio State University and is a retired Navy Master Chief Machinist's Mate. Mr. Cook has over 45 years of maintenance experience in commercial, military, research and the Department of Energy (DOE) facilities, including both nuclear and nonnuclear applications. He has performed, supervised, managed, evaluated, and regulated essentially all facets of maintenance. Mr. Cook has over 25 years of regulatory experience with the Nuclear Regulatory Commission (NRC), Commonwealth of Pennsylvania, and DOE in evaluating maintenance and construction or modifications at nuclear facilities, including decontamination and dismantlement. At the DOE facilities, Mr. Cook has evaluated contractor programs for compliance to Conduct of Operations, Configuration Control, and Maintenance Management. Through these experiences, He is conversant with NRC licensing and compliance to facility technical specification requirements, licensing amendments, limiting conditions for operations, operational safety requirements, and processes for determining unreviewed safety questions. Mr. Cook's experiences include Principal Inspector, Technical Support Inspector, Senior Resident Inspector, and Systems Engineer for the NRC/AEC; Pressurized Water Reactor Group Leader for the PA Department of Environmental Resources; and as a Principal Engineer and Maintenance Engineer Contractor to the DOE at the High-Flux Isotope Reactor and the Y-12 Plant facilities.

Charles M. Coones

Charles Coones has both a B.S. degree and a masters of Engineering, in civil engineering, from the University of Louisville and has over 19 years experience in construction and operation of nuclear facilities. Mr. Coones is a registered Professional Engineer and is a member of NFPA and SFPE.

He served with the Tennessee Valley Authority, Public Service Indiana and Gulf States Utilities at their nuclear plant construction sites. At the Gulf States River Bend Station, Mr. Coones was the lead Fire Protection Engineer during construction and operations, designing suppression and detection systems, providing Appendix R compliance, handling licensing issues, and performing maintenance and testing. At Westinghouse Savannah River Corporation, Mr. Coones served as the lead Fire Protection Engineer for the Reactor Restart Division. He was responsible for resolution of fire protection issues leading to the eventual restart of the K-reactor at the Savannah River Site (SRS). This activity included issue of the first DOE reactor fire hazards analysis and safe shutdown analysis; creation of a commercial-style fire protection program at SRS, and fire protection modifications inside the reactor building. Mr. Coones was later promoted to Manager, Fire Protection Technical Support, with responsibility for fire protection engineering across the SRS site.

Since 1992, he has been at the Y-12 Plant, providing support to the Y-12 Site Office (YSO) in the areas of fire protection and industrial safety. At the Y-12 Plant, Mr. Coones has assisted YSO in review of safety basis documents, fire hazards analyses, and other contractor submittals. He has performed appraisals of the contractor's fire protection program, emergency response capability, and made fire protection inspections of facilities and equipment. Mr. Coones has also served as a fire protection mentor to the Los Alamos National Laboratory during the shutdown of the TA-55 facility, and assisted DOE-ALO in fire protection appraisals of LANL. He has also assisted DOE fire protection activities at the K-25, Paducah, and SRS sites. Locally, he is a fire protection instructor for the Tennessee Valley Public Power Producers Association. Mr. Coones has a PE in fire protection and is a member of NFPA and SFPE.

Jeffrey K. Cravens

Jeffrey K. Cravens has a B.S. degree, in Mechanical Engineering, from the University of Tennessee and ten years experience in the nuclear field.

He was previously employed by the Department of the Navy at the Norfolk Naval Shipyard. His duties included Shift Refueling Engineer and Chief Refueling Engineer in the Nuclear Refueling Division, Nuclear Engineering and Planning Department. Mr. Cravens' duties and assignments also included writer of nuclear refueling technical procedures and supervisor of the Procedure Issue Branch and Training Branch.

Mr. Cravens began work in 1995 with the Y-12 Site Office of the Department of Energy Oak Ridge Operations. He has qualified and worked as a Facility Representative for facilities occupied by the Depleted Uranium Operations, the Special Materials Organization, the Y-12 Development Division, the Analytical Services Organization, and the Y-12 Site Operations Center.

James C. Douglas

James C. Douglas has a B.S. degree, in Biology with a minor in English, from Charleston Southern University and Clemson University. He has approximately 18 years experience in the nuclear industry. He was employed by the Department of Navy (DON) at the Charleston Naval Shipyard (CNS), Charleston, South Carolina, in March 1980. He served as the Occupational Safety and Health (OSH) Specialist (Project Leader) at CNS and independently planned, scheduled, organized, and conducted required OSH audits. He was designated as the Respiratory Protection Administrator and the Proficiency Analytical Testing Administrator for asbestos analysis at CNS. He moved to the Radiological Control Organization (RCO) at CNS in March 1986. Mr. Douglas served as the Environmental Health Physicist (Section Leader) in the Radiation Health Division and provided the technical direction in the qualitative and quantitative analysis of the Environmental RCO Sampling Program. From 1987 to 1989, he served as the RCO Dosimetry Health Physicist (Project Leader) and supervised the technical direction of the personnel Radiation Dosimetry Program at CNS. He served as the Health Physicist (Project Leader) on special projects that were assigned by the Director of Radiological Control. Two examples of these projects were: 1) a detailed analytical report of the CNS Radiological Control Technicians Training Program to the Director of Radiological Control, and 2) an effective personnel radiation exposure reduction in the Navy's Resin Catch Tank Processing Program, which was completed on schedule and under budget (\$7.5 million project). As the RCO Medical Health Physicist (Section Leader), he planned and organized the methods for accomplishing the Radiation Health Medical Program. He served as the Chief Technical Administrator in Radiation Health for CNS and the Naval Hospital - Charleston. From 1992 to 1995, he served as a Senior Manager Health Physicist in the Radiation Health Division. He provided overall administrative, supervisory, and technical direction to a staff of forty personnel, including Nuclear Engineers and Health Physicists, including duties to provide radiological health direction to the Naval Hospital Occupational Medicine Department. Mr. Douglas received the DON Civilian Meritorious Award, which is the highest award that can be given to a civilian.

Mr. Douglas joined the Department of Energy (DOE) Oak Ridge Operations (ORO) Office in January 1995. He served as the Health Physicist in the Engineering Services Division and was responsible for planning, developing, and evaluating the Radiological Control Program of the Construction Manager at the five ORO Sites. At the present, Mr. Douglas is serving as the Y-12 Site Office Health Physicist. He is responsible for planning, developing, and evaluating the Y-12 Plant Radiological Control (RADCON) Program. He serves as the Management's personnel onsite Technical Representative.

Randy C. Foust

Mr. Foust received a B.S. degree, in Mechanical Engineering, and an MA degree, in Business Administration, from the University of Tennessee, Knoxville, and has 18 years experience in the nuclear field. During his tenure at Department of Energy (DOE) Y-12 Site, Mr. Foust has performed assessment activities, verifying readiness to restart nuclear operations in Disassembly and Storage Organization (DSO), Depleted Uranium Organization (DUO), Special Materials Organization (SMO), and Enriched Uranium Organization (EUO). Areas of assessment conducted at the Y-12 Plant include management systems, configuration management, conduct of operations, engineering, procedures, and training.

Prior to his current assignment at the Y-12 Site Office, Mr. Foust spent 5 years at DOE's Savannah River (SR) plant where he was initially employed by Westinghouse Savannah River Company (WSRC) in the Reactor Quality Assurance Department of the Reactor Division and later transferred to the Environmental Protection Department of the ESH&QA Division. At SR, Mr. Foust was assigned duties of Division Coordinator for interface and resolution of DOE Deficiencies, Lead Quality Engineer for the review of Design Modification Packages, ALARA Committee Member, Quality Representative on the Startup Test Review Board, Principal Engineer/Team Lead on the Readiness Self-Assessment for Chargeback and Restart of K-Reactor, and Environmental Support and Regulatory Interface for Transition and Decontamination & Decommissioning activities. Prior to joining WSRC, Mr. Foust spent 10 years working in the commercial nuclear field. Initially, Mr. Foust worked for the Tennessee Valley Authority where he was assigned duties of Responsible Systems Engineer for the construction, modification and testing of NSSS and Safety Systems on a Westinghouse PWR, and, later, Staff Specialist on Environmental Qualification per 10CFR50.49. He also worked on the Clinch River Breeder Reactor Project as an Assistant Cognizant Engineer for Westinghouse, Advance Reactor Division and spent 2 years working as a Marketing Manager and Senior Environmental Qualification Engineer for a independent engineering materials testing laboratory.

M. Brad Graves

Brad Graves has a B.S. degree, in Health Science, from Athens State College and has over 18 years of experience in the field of Health Physics. Mr. Graves is registered by the National Registry of Radiation Protection Technologists and is an associate member of the American Academy of Health Physics. Prior to accepting a position with the PAI Corporation for providing technical support to the Department of Energy (DOE), Mr. Graves held several management and senior consulting positions both in the commercial power industry and in the DOE. Mr. Graves was initially employed by the Tennessee Valley Authority and was assigned to the Browns Ferry Nuclear Plant, where he served for 10 years. His progressive responsibilities included serving as Radiological Control Shift Supervisor and Lead Training Instructor. Mr. Graves then accepted a position as the Health Physics Field Operations Manager at the Paducah Gaseous Diffusion Plant, supervising the efforts of 35 professional and technical employees. Mr. Graves was given the opportunity to manage the Health Physics Program improvements that were necessary for the restart efforts at the Sequoyah Fuels Facility in Gore, Oklahoma. The facility regained its operating license from the Nuclear Regulatory Commission. Mr. Graves' most recent assignment was to manage the overall Health Physics Programs for environmental remediation, decontamination, and decommissioning activities at five DOE sites, with total project revenues of \$150 million dollars per year.

He is currently assigned to the DOE Y-12 Site Office and provides technical support to the DOE Radiological Control Program Manager.

Sarah E. Hartson

Sarah E. Hartson has both a B.S. degree and an M.S. degree, in Physics, from the University of South Florida. She joined the Department of Energy (DOE) in early 1992. Her duties included facility safety, orders/standards compliance, environmental compliance, and various collateral duties. She has participated in the development, review, and approval of numerous safety analyses and environmental analyses while employed with the DOE. She has served as Contracting Officer's Representative and Contract Technical Monitor for various areas, including facility and nuclear safety and the associated orders/standards compliance. She has served as National Environmental Policy Act Compliance Officer, Defense Nuclear Facilities Safety Board Liaison, and Standards Manager. Her responsibilities have also included training development and presentation for risk management. She has been a member of the management teams for two Technical Safety Appraisals as well as a functional area (nuclear safety) expert.

Brenda L. Hawks

Brenda L. Hawks has two B.S. degrees, in Chemical Engineering and Polymer Chemistry, and an M.S. degree in Polymer Chemistry with minor in Chemical Engineering. Other qualifications include Chief Refueling Engineer on two different reactor plants, Radiological Engineer, Quality Control Technical Work Document Preparer/Reviewer/Approver, and Radiation Worker.

Ms. Hawks currently serves as a Facility Representative of the Department of Energy Oak Ridge Operations in the Enriched Uranium Operations. In this position, she is the primary component of the YSO contractor oversight program with the responsibilities for routine assessments of operational performance, quality assurance, management control, and assurance of worker safety and health.

Ms. Hawks served as an Environmental Engineer at the Charleston Naval Shipyard, performing environmental aspects of closure and cleanup of the Charleston Naval Shipyard, Charleston Naval Station, Naval Supply Center, and surrounding areas. As a Reactor Engineering Nuclear Engineer, she prepared, reviewed, and approved work packages to ensure compliance with the Naval Nuclear Propulsion Program technical and administrative requirements, safety, quality assurance, waste reduction, criticality controls, environmental regulations, cleanliness and radiological requirements. She was also responsible for training and qualifications for all refueling engineers. Ms. Hawks served as a Refueling Engineer at the Charleston Naval Shipyard. She was responsible for refueling operations conducted on shift; ensured compliance with technical, administrative, quality assurance, criticality, radiological, environmental, personnel safety and health, and cleanliness requirements; and conducted required accident investigations, following them from notification through corrective action implementation.

As the Nuclear Performance Assessment and Radiological Engineer, Ms. Hawks performed personal, independent studies and investigation of nuclear work, facilities, procedures, and workmanship and analyzed data to ensure corrective actions were properly implemented and adequately resolved the problem. She performed walk-through inspections and observed procedure performance to assess quality control, radiological controls, technical adherence, safety and health implementation, and environmental controls.

Daniel K. Hoag

Daniel K. Hoag received a B.S. degree, in Industrial Safety, from the Central Missouri State University in 1980 and an M.S. degree, in Safety, from the University of Tennessee in 1994, and completed several graduate courses in Industrial Engineering from the University of Utah. He is also a Certified Safety Professional (CSP) by examination.

Mr. Hoag currently serves as the Chief of the Environment, Safety and Health Branch for the Y-12 Site Office of the Department of Energy (DOE) Oak Ridge Operations Office. In this position, he is responsible for management of the federal staff involved in the line management oversight of the M&O contractor development and implementation of programs in the functional ES&H areas of Nuclear Safety, Radiation Control, Industrial Hygiene, Industrial Safety, Fire Protection and Environmental Compliance. He previously served as a safety engineer at the Y-12 Site Office with responsibility for day-to-day oversight of contractor safety and health activities. Prior to his assignment at Oak Ridge, he performed safety and health oversight for the DOE at the Savannah River Site (SRS) in Aiken, South Carolina.

Mr. Hoag started his career as a staff Safety and Health Engineer for Kennecott Minerals Corporation in Salt Lake City, Utah. His responsibilities included the development and implementation of a site-wide safety and health program at the open-pit mining operation and the concentration facilities within the Utah Copper Division. He was also responsible for conducting plant safety and health inspections and audits to ensure compliance with regulatory requirements, performing accident investigations to determine root causes and provide recommendations to line management for prevention of accidents, and performing design reviews of a facility changes to ensure appropriate safety and health considerations were incorporated into modifications.

Prior to federal government service, Mr. Hoag served as the Safety Officer for Wackenhut Services, Inc., a contractor responsible for providing para military security operation and law enforcement services to the DOE SRS. In this position, he was responsible for managing a staff to ensure implementation of a comprehensive safety and health program, covering diverse activities and operations such as firearms and weapons training, aviation operations, explosives storage and use, motor vehicle operations, and tactical training activities.

J. Dale Jackson

Dale Jackson received a B.S. degree, in Mechanical Engineering, from the University of Tennessee in 1982. Mr. Jackson serves as the Acting Y-12 Site Manager for the Department of Energy (DOE) Y-12 Plant. In this position, he directs the planning, management, and execution of programs that support the operation of the Y-12 Plant. Mr. Jackson first joined the Facility and Systems Safety Branch of the Oak Ridge Operations in 1991. In 1993, he served as Regulatory Oversight Manager, responsible for implementation and administration of all facets of the Regulatory Oversight Agreement between the U.S. Enrichment Corporation and the DOE for the Paducah and Portsmouth Gaseous Diffusion Plants and for the transition of regulatory responsibility for these facilities to the Nuclear Regulatory Commission. Prior to this service, Mr. Jackson worked for 14 years with the Tennessee Valley Authority (TVA) in Knoxville. As a Senior Nuclear Specialist at TVA, he was involved with nuclear safety analyses, modifications, and operational evaluations for the restart of the Browns Ferry Nuclear Plant.

Peggy J. Jackson

Peggy J. Jackson is currently pursuing a B.S. degree in Business Management. She has been employed with the federal government (AEC/ERDA/DOE) at the Y-12 Plant for 24 years. She began her career in 1974 as a secretary in the AEC/Y-12 Quality Assurance Branch (Weapons). She was promoted to a Quality Assurance Specialist in 1985, where her duties included the planning and execution of surveillance activities of contractor operations and the formal DOE acceptance of products manufactured by the contractor. In 1993, she was reassigned as a Management Analyst to oversee the contractor's Occurrence Reporting System and Personnel Training Program. Currently, Ms. Jackson's position is a Defense Programs Support Specialist. She provides programmatic oversight and guidance on the occurrence reporting system. She has direct contact with the Y-12 Site Facility Representatives. She provides advice and assistance to the Y-12 Site Office candidates under Defense Nuclear Facilities Safety Board Recommendation 93-3.

F. Edward Kendall

Ed Kendall has two B.S. degrees, in Nuclear Engineering and in Electrical Engineering, from the University of Maryland. Mr. Kendall has worked for Department of Energy Oak Ridge Operations (DOE-ORO) as a Nuclear Engineer for 9 years. He has had ORNL research reactor safety responsibilities with approximately 1 year on site (HFIR), and continued engineering support. Additionally, he has approximately 6 years of nuclear criticality safety oversight and support for the K-25 Site and other ORO sites and has 2 years of Facility authorization basis documents review and approval with the Facility Safety Engineering Team. Other responsibilities include lead engineer for DOE Order 5480.6, *Reactor Safety*, and DOE Order 5480.30, *Reactor Design Criteria*; the DOE-ORO lead coordinator role (development of the initial implementations and oversight support) for DOE Order 5000.3 A/B, *Occurrence Reporting and Processing of Operations Information*, occurrence reporting system and the DOE Order 5480.26, *Trending and Analysis of Operations*, performance indicators system; and the INPO documents control. This position provided a variety of formal training in nuclear criticality safety codes and methods, Conduct of Operations (including teaching some modules in the Oak Ridge courses), Operations Readiness Reviews, MORT accident investigation (certification as a trained investigator) and other routine facility access courses.

Prior to coming to DOE, Mr. Kendall was employed by the Tennessee Valley Authority (TVA) in the Nuclear Engineering Branch, Knoxville. Responsibilities included severe accident sequence analysis in support of TVA's nuclear plants (Pressured Water Reactor) design: Westinghouse - Watts Bar and Sequoyah, B&W - Bellefonte, and Boiling Water Reactor design: GE - Browns Ferry) mainly using state of the art thermal-hydraulics codes (mostly RETRAN and RELAP). Additional analytical tasks included code verification and QA work, development of codes for secondary containment loss of coolant accident analysis and fission product transport, containment analysis, and other sundry tasks such as reactor coolant pump void monitor, critical break curves, AMSAC design criteria, and risk tree. This position provided formal training and experience with a wide variety of nuclear engineering codes, and company publication of many technical reports and several codes developed.

Prior to his work at TVA, Mr. Kendall worked approximately 2 years with a private health physics firm, Radiation Service Organization (RSO) while also attending class. Responsibilities, primarily associated with RSO's instrument repair and calibration facility, included calibration and repair of a variety of health physics and nuclear-related instruments, shielding calculations for the Cs-137 calibration range, health physics surveys, and verification/calibration of instrumentation for RSO's health physics laboratory.

Thomas A. Larkin

Thomas A. Larkin has a B.S. degree, in Civil Engineering, from New York University and an A.S. degree, in Applied Science, from Westchester Community College.

Mr. Larkin, as a Quality Engineer, for the Department of Energy (DOE), plans and conducts on-site appraisals and assessments of government prime contractors (O&M, D&D, Construction). Develops Oak Ridge orders for operational readiness review program, quality program, and the Functions, Responsibilities, and Authorities Manual. Investigates accidents and incidents as requested by management. Supports the Y-12 Site Office in the area of quality programs. His previous responsibilities with the DOE, include managing the construction and startup of the process buildings of the Gas Centrifuge Enrichment Project. After project termination in June 1985, acted as the Government site representative for operations and maintenance of the Portsmouth Diffusion Plant. Performed investigations of safety complaints for the ORO Safety and Health Division.

Prior to joining the DOE, he served the Federal Highway Administration as a Highway Engineer. He initiated, wrote, and managed contracts for the development, testing, and evaluation of new technology and management systems. Edited and published reports for nation-wide distribution. Provided technical advice to Federal Offices, States, and industry in cognizant areas.

As General Engineer for the Army Material Command. Mr. Larkin performed technical and engineering reviews, analyses, and assistance during the development, screening, approval, and construction phases of energy projects. Prepared the program for submission to the Congress. For the U.S. Navy, he managed all phases of construction contracts. Negotiated and wrote all construction contract modifications. Other experience included performing structural analyses of various structures, supervising the preparation of final contract drawings, and writing construction specifications. Mr. Larkin also prepared formal bid estimates, set up contracts with subcontractors, supervised all aspects of construction work and subcontractors building a \$176-million hospital in New York City, investigated field problems and provided data to the owner's representative, and assured compliance with State and Federal safety laws and regulations.

Mark A. Livesay

Mark A. Livesay has a B.S. degree, in Mechanical Engineering, from the University of Tennessee and has over 17 years of experience in the nuclear field. He is currently pursuing course work (distance learning) toward an M.S. degree, in Engineering Management, from the University of Alabama, Huntsville.

Prior to joining the Department of Energy (DOE) in 1990, he was employed by the Tennessee Valley Authority for over 8 years, where he served as a nuclear safety system engineer on both pressurized and boiling water reactors. His duties included the independent design review of nuclear plant features and safety-related systems to ensure maximum overall plant safety and compliance with regulatory requirements. He prepared design criteria, system descriptions, test requirement documents, Q-Lists, and reviewed and approved design changes. From 1982 to 1983, Mr. Livesay served as a Licensing Engineer responsible for drafting and implementing procedures for the identification, evaluation, and reporting of construction, start-up, and hot functional testing deficiencies to the U.S. Nuclear Regulatory Commission (USNRC) in accordance with 10CFR50.55(e). Mr. Livesay joined DOE in 1990 at the Oak Ridge Operations Office in the Safety and Health Division. He was responsible for the independent review of contractor-generated safety documentation for technical adequacy and compliance with DOE Orders and regulations.

Mr. Livesay came to the Y-12 Site Office in March 1991, where he served as facility representative for several process buildings at the Y-12 Plant that house enriched uranium recycle and recovery, uranium storage, and weapon assembly and disassembly. He was responsible for daily oversight of the assigned facilities and associated activities to identify issues related to formal conduct of operations and safety and health. He currently serves as the Chief of the Program Management Branch and is responsible for managing, directing, and coordinating the development and implementation of policies and plans for executing Y-12 Plant missions. He negotiates the technical contract terms and conditions and establishes programmatic objectives, performance criteria, and performance metrics for the contractor's successful execution of plant missions.

Charles C. Mason

Charles C. Mason has a BA degree, with a major in chemistry, from the University of North Carolina and has over 30 years experience in the nuclear field. Mr. Mason participated in the Navy Nuclear Program, including service in the Nuclear Submarine Program. Following this service, he was employed by the Tennessee Valley Authority (TVA) for 17 years. During this time, he held various engineering, supervisory, and management positions, including Plant Manager at Watts Bar and Sequoyah Nuclear Plants.

Following an assignment as Site Director at Sequoyah, Mr. Mason accepted employment with Kansas Gas and Electric Company at the Wolf Creek Generating Station, serving as Site Director and Director of Operations during testing, licensing, startup, and initial operation of this station. Following this assignment, Mr. Mason returned to the TVA as Deputy Manager of Nuclear Power. His responsibilities included managing the efforts to restart Sequoyah and Browns Ferry Nuclear Plants. After retirement from the TVA, he accepted employment with the Department of Energy (DOE) at the Savannah River Operations Office. With the DOE, he served as the Assistant Manager for Material Processing and was responsible for the startup of the Replacement Tritium Facility and for the operation of various other tritium facilities. He was also responsible for all reprocessing facilities, including the restart of HB Line, H Canyon, FB Line, and F Canyon. Additional responsibilities included the Fuel Manufacturing Facility, the Spent-Fuel Facility, and the five shutdown production reactors. Since retirement in 1994, Mr. Mason has been an independent consultant, providing services to DOE and others in the nuclear industry.

Diane McCarten

Ms. McCarten received an A.S. degree, in Legal Secretarial Science, from Middle Georgia College and a B.S. degree, in Business Administration in Management, from Kennesaw University.

Ms. McCarten has 15 years experience with the Internal Revenue Service in Atlanta, Georgia. While with the Service, she was a real estate appraiser and the District Outside Fee Coordinator. Ms. McCarten joined the Department of Energy (DOE) in 1992 and has been a member of the Y-12 Site Office (YSO) since September 1994. At the YSO, she is the Program, Compliance and Assessment Specialist who reports directly to the Site Manager, and her position is to provide the YSO management with the analytical and administrative support necessary to make decisions on the administrative and programmatic aspects of the weapons program operation and management.

Ms. McCarten provides a focal point for a range of business, budgetary, compliance, and assessment matters pertaining to the YSO. A portion of her duties includes serving as the Issues Manager and the Defense Program Compliance Manager for the YSO. She has been instrumental in the development of the YSO's deficiency-tracking system that not only tracks the deficiencies against the YSO but also tracks the deficiencies issued to the contractor. Ms. McCarten's duties also include providing analysis and evaluations on the overall effectiveness and efficiency of various plant programs and functions; measuring and evaluating the contractor's performance in the area of resource management; serving as the point of contact for Work Force Restructuring and Economic Development Programs, and serving as the Contract Task Manager for the YSO computer support services contract and the administrative support services contract. Ms. McCarten provides support on numerous cross-cutting issues, organizational issues, and personnel matters.

Susan D. Morris

Susan D. Morris attended the University of Tennessee and received a B.S. degree in Industrial Engineering in 1986, an M.S. degree in Industrial Engineering in 1988, and an M.S. degree in Environmental Engineering in 1995.

She has been serving as an Environmental Engineer with the Department of Energy Oak Ridge Operations (ORO) since 1992. Her duties include serving as the Y-12 Site Office senior environmental engineer in charge of the Clean Water Act (CWA), National Environmental Policy Act (NEPA), National Historic Preservation Act (NHPA), Industrial User Permit (sanitary wastewater), and other related programs. Oversight duties include budget reviews, involvement with the line item projects related to environmental projects (i.e., review of the System Requirement Documents, Conceptual Design Reports, and related project information). From 1988 to 1992, she served as a General Engineer with ORO. Her responsibilities included information systems management (design, implementation, maintenance, and upgrades), Systems Manager for the division's Local Area Network, and ADP Coordinator for the division. She also served as Contract Technical Monitor for various subcontractor tasks and provided initial development of ORO's Cultural Resource Management Program. From 1986 to 1988, Ms. Morris served as a Programmer Analyst and as an Engineering Aide with the Tennessee Valley Authority.

John D. Pearson

John D. Pearson received a B.S. degree, in Engineering, and an M.S. Engineering degree, in electrical engineering, from Vanderbilt University. He has received several hours of training in Industrial and Construction Safety, Industrial Hygiene, Occupational Medicine, Health Physics, Management, Computer Applications, and Environmental Protection. Mr. Pearson is also qualified in the Department of Energy (DOE) Technical Qualifications Program for all parts of the General Technical Base and Occupational Safety competencies. He is also a Certified Safety Professional (CSP). He has written several professional papers and publications.

Mr. Pearson has a total of 25 years professional experience in all disciplines of environment, safety, health, and emergency management. He is presently a Safety Engineer for the DOE Y-12 Site Office (YSO), responsible for emergency management, construction safety programs, and lessons learned programs. Mr. Pearson has also served the DOE Oak Ridge Operations (ORO) for 10 years as a Safety Engineer, covering all ORO operations. Mr. Pearson was also a General Engineer for 3 years, directing environmental restoration and waste management planning, waste minimization, classified waste, Waste Treatment Policy and Strategy, Waste Management Reporting Systems, Hazardous and Radioactive Waste Management Order compliance, public meetings, occurrence reporting, performance indicators, waste tracking and waste information network.

Mr. Pearson also served for 6 years as Manager of Environment, Safety, and Health (including Emergency Management) for the DOE's Energy Technology Center in Morgantown, West Virginia. He also served as a Safety Engineer for the U.S. Army Corps of Engineers for 4 years and as a Safety Engineer and Research Chief for the Tennessee Department of Labor.

Frank S. Poppell

Frank S. Poppell received a B.S. degree, in Nuclear Engineering, from the Georgia Institute of Technology and has 21 years experience in the nuclear field.

For the last 3 years, he has supported the Department of Energy (DOE) Y-12 Site Office with the performance of numerous assessments during mission area restarts primarily in the Conduct of Operations and Facility Safety functional areas. Mr. Poppell has 3 years experience at the DOE Rocky Flats and Savannah River facilities performing safety evaluations, assisting with the resolution of DOE issues for restart of K-Reactor, evaluating Department of Energy (DOE) oversight concerns (Operational Readiness, Tiger Team, and Defense Nuclear Facility Safety Board Reviews) for incorporation into waste management facility startup documents, and performing DOE Order compliance assessments. He has 11 years experience in the commercial nuclear industry primarily in the areas of Licensing/Regulatory Compliance, Reactor Engineering, and Operations as a Shift Technical Advisor. Mr. Poppell's commercial nuclear power experience includes coordinating resolution of Nuclear Regulatory Commission issues, providing Operations oversight for Technical Specification operability and reportability determinations, directing control rod movements and power maneuvers, and preparing/reviewing Unreviewed Safety Question evaluations. He also has 4 years nuclear experience at Charleston Naval Shipyard as a Shift Test Engineer coordinating reactor plant testing on submarines during overhaul and refueling.

Jerry Robertson

Jerry Robertson serves as Safety and Occupational Health Manager for the DOE at Oak Ridge Operations. He holds an A.S. degree, in Business Management, from Roane State College and has completed various undergraduate technical courses at the American Nuclear Technical Institute and Tusculum College. Mr Robertson is a Board Certified Safety Professional (CSP) in Comprehensive Practice and is a professional member of the American Society of Safety Engineers and serves as Vice-President of the East Tennessee Chapter. He has managed the DOE Y-12 Site Office Occupational Safety and Health program since 1988 and has 22 years of government service. Mr. Robertson has extensive safety and health training of over 800 hours, with approximately 200 hours at the OSHA Institute in Des Plaines, Illinois. Since 1988, he has participated in every major safety and health appraisal conducted at the Y-12 Plant and has conducted more than 20 formal safety and health appraisals since 1990. He previously worked on detail at the Occupational Safety and Health Administration (OSHA) Area Office in Atlanta, Georgia.

Thomas Rogers

Mr. Rogers received a B.S. degree, in Nuclear Engineering, from the Georgia Institute of Technology and has 19 years experience in the nuclear field. He has over 6 years experience at the Department of Energy (DOE) facilities, including the Y-12 Plant; the Germantown, Maryland, offices; the Princeton Tokamak; and the Los Alamos TA-55 Plutonium Facility for DOE and at Savannah River on the K-Reactor and In-tank Precipitation Facility for the Westinghouse Savannah River Company (WSRC). His duties included DOE oversight assessments for DOE and operational readiness review team member for WSRC. Mr. Rogers also has 8 years experience in the commercial nuclear industry where he participated in numerous performance-based assessments, including conduct of operations assessments, emergency-operating-procedure assessments, safety system functional inspections, and quality assurance audits. He also participated in restart efforts at the Sequoyah, Indian Point 3, North Anna, and the Rancho Seco nuclear power stations. Additional commercial nuclear power experience includes over 3 years with the Nuclear Regulatory Commission where he served as an operator-licensing examiner for pressurized-water reactors. He also has 5 years experience at a naval shipyard as a nuclear shift-test engineer on fast-attack submarine and cruiser reactor plants.

Lawrence M. Sparks

Larry Sparks graduated from Virginia Tech in 1979 with a B.S. degree in Civil Engineering and is a Licensed Professional Engineer in the Commonwealth of Virginia. Since 1994, he has been serving as the Department of Energy (DOE) Y-12 Site Office senior environmental engineer in charge of the Resource Conservation and Recovery Act (RCRA), the Toxic Substances Control Act (TSCA), the Underground Storage Tanks, the Pollution Prevention, and other related programs. From 1990 to 1994, Mr. Sparks was a DOE Facility Representative who provided day-to-day technical evaluation and monitoring of all aspects of support systems and operations within Buildings 9720-5, 9204-2/2E, and the 9212 Complex, which included: operational and industrial safety, criticality safety, maintenance, environmental protection, radiological controls and emergency response. From 1988 to 1990, he served as senior staff engineer with Oak Ridge Office responsible for general oversight and guidance for the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) program. Major duties included performing audits and appraisals at ORO facilities for compliance with CERCLA, RCRA, and TSCA. From 1986 to 1988, Mr. Sparks served as senior program manager for DOE's (EH-23) CERCLA program. Major duties included developing guidance, both written and in the form of training, for DOE's use in implementing the requirements of CERCLA. Also served as the primary representative for DOE on the National Response Team. From 1979 to 1986, Mr. Sparks served as staff engineer with the Naval Facilities Engineering Command responsible for a wide range of activities dealing with all environmental disciplines. Major duties included audits and appraisals of Navy Activities; hazardous waste, remedial action, and asbestos program management; design and review of pollution abatement projects; contract management; and many other duties as assigned.

Robert J. Spence

Robert J. Spence received a B.S. degree, in Civil Engineering, from Auburn University in 1965. He has been a civil servant for 33 years and has served as the U.S. Department of Energy (DOE) Site Manager for the Y-12 Plant since 1985. In this position, he is the Contracting Officer's Representative for the plant operated by Lockheed Martin Energy Systems, Inc., and directs planning, management, and execution of programs supporting the operations of the plant, which has an annual budget of \$500 million. These programs include the assembly, disassembly, and quality evaluation of nuclear components, storage of special nuclear materials, work-for-other government agencies, technology transfer to industry, maintenance, quality assessment, conduct of operations, environment, safety and health, site planning, and physical security programs. He manages all activities of the Y-12 Site Office (YSO) through 70 technical and administrative staff and provides liaison with DOE Headquarters and other Operations Offices, Defense Nuclear Facilities Safety Board, State of Tennessee, Environmental Protection Agency, and local community. He frequently required to make technical, informational, and motivational presentations to varied audiences, ranging from elected officials, departmental officers, public groups, Congressional oversight organizations, private industry, foreign delegation, and his YSO staff.

Mr. Spence joined the DOE Oak Ridge Operations in 1974 as a member of the Engineering Division. In 1977, he moved to the Enriched Expansion Projects Office and served as Lead Civil Engineer, Director of Design Division, and Engineering Manager. He was appointed Project Director in 1984, serving in that position until appointed DOE Site Manager for the Y-12 Plant, and was responsible for developing and directing all engineering, central procurement, project technical support and overseeing activities associated with the Portsmouth Gas Centrifuge Enrichment Plant. The plant was a multibillion-dollar expansion of the uranium enrichment capability for the DOE.

He held the position of design engineer with U.S. Army Corps of Engineering and was involved in the engineering and construction of the Ballistic Missile Defense System facility and was a co-op student with the Corps of Engineers while attending college.

Andrew J. Stevens

Andrew Stevens received a B.S. degree, in Nuclear Engineering, from Mississippi State University and an MBA degree from Old Dominion University. The first 18 years of his career were in various segments of the commercial nuclear industry from design and manufacturing of nuclear steam supply systems to systems for decontamination and disposal of low-level wastes. He has served for 11 years in the DOE weapons programs and manufacturing environment and has served as Program Manager for the Maintenance Program at the Y-12 Plant for the past 3 years as well as for other activities related to facilities, including utilities and capital projects. At Savannah River, Mr. Stevens served as the first startup engineer for the Replacement Tritium Facility and served in a dual capacity as Program Manager and Facility Representative in the M-Area, which manufactured fuel and targets for the production reactors. His engineering activities have included design and manufacturing of systems and components for piping, electrical control, materials handling, HVAC, and structures. The technical and management activities have included quality assurance, quality control, auditing, familiarity with nondestructive methods, supervision, and financial controls.

Mark A. Sundie

Mark A. Sundie has a B.S. degree, in Nuclear Engineering, from the Pennsylvania State University and has more than 17 years experience in the nuclear field. Prior to joining the Department of Energy (DOE), he was employed by the Tennessee Valley Authority for 10 years, where his duties included, nuclear engineering, reactor core surveillance, Restart Test Director, and Refueling Test Director. Mr. Sundie joined DOE in late 1989 at the Savannah River (SR) Operations Office under the Assistant Manager for Defense Programs, Separations Division. His duties included assignments as Facility Representative, Program Engineer, and Division Training Liaison. While in this assignment, Mr. Sundie participated in the DOE Order Compliance reviews and completed all the necessary division requirements for a subject matter expert in the area of Training and Qualification programs. His restart experience consisted of roles as a team member in the HB-Line, FB-Line, and 247F Operational Readiness Reviews and as the DOE-SR Team Leader for both the F-Canyon and the FB-Line Restart efforts, where he supervised 18 subject matter experts from the DOE-SR staff and validated the contractor's state of readiness prior to commencement of the independent ORR. Mr. Sundie joined the Y-12 Site Office (YSO) in February 1995, where he serves in this current position as Training Program Manager and Restart Team Leader. He served as team leader for the DOE YSO Restart Team for Receipt, Storage, and Shipment and Depleted Uranium Operations Restart and participated in the restart review of Quality Evaluation and Disassembly and Assembly Readiness Assessments. He is currently engaged in the restart validation review of Enriched Uranium Operations.

Thomas S. Tracy

Thomas S. Tracy has a B.S. degree, in Nuclear Engineering, from the University of Florida and is a licensed Professional Engineer in Mechanical Engineering. In addition, Mr. Tracy is a certified Senior Reactor Operator (SRO) at two commercial nuclear sites and is also a certified instructor. He has over 20 years of nuclear experience with U.S. Navy, commercial, and DOE nuclear facilities, and he has supported commercial utilities at four different nuclear sites and has provided technical support to DOE at numerous facilities on two sites.

Mr. Tracy has performed a wide variety of duties for commercial utilities and DOE, including procedure development, training, operations support, engineering support, issues management, post-modification testing, and facility oversight. Mr. Tracy was the post-modification test coordinator during testing following a new instrumentation system installation at E. I. Hatch nuclear plant. He was the lead engineer for a procedure-upgrade program at E. I. Hatch nuclear plant and was the technical manager for a similar upgrade program at Browns Ferry nuclear plant. Mr. Tracy was the operations task leader at Savannah River during the K-Reactor restart period.

Mr. Tracy's restart experience includes three years at Browns Ferry nuclear plant where he validated upgraded operations procedures and newly issued configuration control drawings, was the technical manager for the emergency operating procedures (EOP) upgrade program and liaison to the site training department for enhanced EOP training, and performed operations reviews of documents submitted for site change control. At the Savannah River Site, Mr. Tracy was the operations task leader for the K-Reactor restart team. In that capacity, Mr. Tracy directed the efforts of ten consultants in the period leading up to and during the restart. His responsibilities included development, review, and approval of the K-Reactor restart Safety Evaluation Report; coordination of the development of restart criteria in 20 functional areas and the performance of assessments in all areas; coordination of on-shift activities for all technical consultants during restart and power ascension testing; and development of an annual assessment plan for continuing operations following shutdown.

Stanley A. Watkins

Stanley A. Watkins received a B.S. degree, in Mechanical Engineering, from Oklahoma State University. Mr. Watkins serves as Facility Representative for the Department of Energy (DOE) Oak Ridge Operations (ORO) and is assigned to Material Access Areas in primary facilities, Buildings 9212 and 9215 Enriched Uranium Operations.

Mr. Watkins has served as the DOE Y-12 Site Office (YSO) Quality Assurance Branch Chief. Duties involved Quality Management oversight of the weapon component production activities for the Y-12 Plant and was actively involved with activities for design/production. He also served as Quality Assurance Engineer, overseeing preproduction activities and performing technical surveys of weapon component production activities. Mr. Watkins has worked for the DOE AAO (Pantex Plant) as Quality Engineering, conducting technical surveys of nuclear weapon production/testing activities required by DOE/AL QC-1 Nuclear Weapon Quality Manual. At Pantex Plant, he also served as Acceptance Equipment engineer, and duties involved technical activities associated with (electrical, fiber optic, pressure/vacuum/ leak test, force, and torque) nuclear weapon test systems. Mr. Watkins wrote operation and calibration procedures for nuclear weapon test equipment.

Steven E. Wellbaum

Steven E. Wellbaum has a B.S. degree, in Electronics, and is a licensed Professional Engineer (mechanical). He has over 24 years of nuclear industry experience in operations, maintenance, testing, design, engineering, and modification. Mr. Wellbaum is qualified for both Disassembly and Storage Operations and Enriched Uranium Operations. He was instrumental in establishing the Y-12 Plant's Facility Representative nationally recognized program and standards. He has overseen the successful restarts in Receipt, Storage, and Shipment; Disassembly and Assembly; and Quality Evaluation. He was the Oak Ridge Facility Representative of the Year in 1996. Prior to joining the DOE, Mr. Wellbaum earned Naval Reactors Engineer Officer at Shippingport Atomic Power Station and qualified as a Joint Test Group member on six different reactor plants and as a Joint Refueling Group member on four reactor plants. He also qualified as an Engineering Watch Supervisor and Nuclear Reactor Operations.

Mr. Wellbaum is currently assigned in the Enriched Uranium Operations restart, and he was the primary Facility Representative during the successful restart of the first two fissile material operations at the Y-12 Plant. He began his career with DOE after 22 years joint U.S. Navy/DOE Naval Reactors Program field work oversight at Newport News Shipbuilding, Mare Island Naval Shipyard, Shippingport Atomic Power Station and several nuclear-powered ships. Mr. Wellbaum has extensive field engineering management experience in surface and submarine nuclear power plant construction, overhaul, refueling, decommissioning, and repair. Mr. Wellbaum led a team of 10 field engineers, supervising the complete fuel and core barrel replacement for the 8 reactors in the USS Enterprise. He worked directly for the Deputy Assistant Secretary for Naval Reactors.

G. F. Weston

Gary F. Weston has a Bachelor of Engineering degree in Marine Engineering from the State University of New York Maritime College and has over 25 years experience in various engineering positions and assignments.

At the Y-12 Plant, Gary has been responsible for assessments of the Lockheed Martin Energy Systems Nuclear Conduct of Operations programs for Receipt, Storage and Shipment, Disassembly and Assembly, Quality Evaluation, and Enriched Uranium Operations mission area restarts. He has also been responsible for review and assessment of process restarts in Special Nuclear Material and Depleted Uranium Operations areas as well as numerous Special Operations Packages for operations and procedure functional areas.

Prior to joining the Y-12 Site Office Restart Team, he was previously employed by Stone and Webster Engineering Corporation where he served in positions as project manager for outage modifications, project design manager, certified lead auditor, lead startup engineer, consultant for events analysis and system operations assessments, design baseline verification program manager and construction completion planning supervisor for various nuclear utilities. During this period, he also spent 2 years on loan to the Institute of Nuclear Power Operations as a program manager in the Events and Analysis Division, responsible for plant operations assessments and event analysis. Prior to these assignments, he was employed by EDS Nuclear as superintendent of mechanical quality engineering for a nuclear construction project; by LPL for both field engineering and startup and test engineering positions; and by Newport News Shipbuilding as a nuclear construction supervisor for overhaul and refueling of S5W plants. Previous to these nuclear assignments, he served in 2nd and 3rd assistant engineering positions aboard various U.S. merchant vessels.

Dana M. Willaford

Dana M. Willaford holds a B.A., in Political Science, and an MPA from the University of Illinois and has 15 years experience with radioactive material packaging and transportation. She spent 3 years with Science Applications International Corporation, developing and delivering transportation compliance training for DOE/DOE contractors. She has spent the past 7 years with the Department of Energy and is presently responsible for the transportation safety function in Oak Ridge Operations. She has participated in numerous assessments, readiness reviews and audits of contractor transportation programs across the DOE complex. She is recognized as an expert within this field both nationally and internationally, and has participated with the International Atomic Energy Agency (IAEA) in developing international standards and regulations for the safe transport of radioactive materials, and provides training to DOT safety inspectors with the Federal Highway Administration (FHWA) and Federal Aviation Administration (FAA).

